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NOTES ON NEOTROPICAL TABANIDAE (DIPTERA) XX. THE LARGER SPECIES OF TABANUS OF EASTERN SOUTH AMERICA

by

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NOTES ON NEOTROPICAL TABANIDAE (DIPTERA) XX. THE LARGER SPECIES OF TABANUS OF EASTERN SOUTH AMERICA[1,3]

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ABSTRACT

Thirty-four large species of *Tabanus* are discussed, keyed and many illustrated. Distribution maps based on material seen are provided for all species. Seven new species are recognized: *Tabanus aaptus* n. sp *Brasil*; Amazonas, Manaus; *T. antunesi* n. sp. *Brasil:* Bahia, Ilheus; *T. duckei* n. sp. *Venezuela:* Mt. Marahuaca and *Colombia*, Caqueta; *T. humboldti* n. sp. *Brasil:* Mato Grosso and Amazonas, Manaus; *T. itaituba* n. sp. *Brasil*: Para; *T. nematocallus* n. sp. *Brasil:* Amazonas, Manaus and *Venezuela*, *Peru* and *Colombia*; *T. xuthopogon* n. sp. *Peru*: Iquitos, Loreto *Ecuador*: Limoncocha, *Brasil*, Para. *T. casteetus* nom. nov. is proposed for *T. testaceus* Macq. preocc., and several new synonymies are proposed.

INTRODUCTION

This review started as an attempt to provide a key for the identification of the larger species of *Tabanus* known from the Amazon basin. In the course of its preparation a number of new species have turned up and certain species thought to be well known and easily recognized have turned out to be complexes of closely similar taxa. It has also proved difficult to decide which species to include and which to omit. I have tried to include all species of *Tabanus* averaging over 15 mm in length, with unpatterned eyes in life, without a strong scutellar black spot or a long appendix at fork of third vein, and which occur east of the main range of the Andes and north of the Argentine border. Species of the *lineola* group, with striped abdomens and banded eyes are being treated elsewhere. Species related to *Tabanus sorbillans*, with a long appendix at fork, and those with banded eyes and a more or less evident scutellar black apot, such as *T. antarcticus*, are omitted. Another group of mainly Andean and West coast distribution with strong central American representation, typified by *Tabanus subruber*, *T. bigoti*, *T. hirtitibia* etc. has one or two species entering the western borders of the Amazon basin,

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but is not treated here as the bulk of the species are Central American. One isolated Central American species *T. punctipleura* Hine is included because of its apparent similarity to *T. nebulosus* and *T. olivaceiventris* which extend into the Amazon basin. Five species described by Kröber and listed in the catalogue (Fairchild 1971) as unrecognized have been reassessed on the basis of their descriptions--the types of all are destroyed or inaccessible--but without enlightenment. The same applies to *T. rubidus* Macq. whose type is headless. Some of these may be synonyms of species treated here, and very likely of species described here as new species, but I prefer the relative certainty of a name based on a series of good fresh specimens to one based on an unfigured inadequate description of a single damaged specimen which is now lost.

Efforts to divide the unwieldy genus *Tabanus* have been numerous but largely unsuccessful, as can be seen from the synonymy given in Moucha (1969) or Fairchild (1971). Such efforts will, and probably should, continue, but should not be undertaken without a thorough knowledge of the world fauna.

The species here considered may be divided into several ill-defined groups which seem to share a few characters of possible phylogenetic interest. I briefly discuss them here to call attention to their possible future consideration in any efforts to divide *Tabanus* into more manageable groups.

T. xenorhynchus group. This includes species with unusually long proboscis, slender flattened palpi, small frontal callus, and usually contrastingly patterned wings and body. Some of the species are known to be arboreal, and others may be. It includes *T. xenorhynchus* Fchld. from Central America, *basilaris* Kröb., *subviolaceus* Fchld. and *sannio* Fchld. from Brasil and *T. unimacula* Kröb. from Surinam and Ecuador. *T. piceiventris* Rond. may also be related here, as it has similar head structures, but lacks wing and body patterns and is not arboreal.

T. nebulosus group. These species have a moderately narrow and generally nearly parallel sided frons with slender clavate or ridge-like callus and a fairly prominent black pilose prescutellar spot. *Nebulosus* and ssp. *ornativentris*, *glaucus*, *importunus*, *olivaceiventris*, *comosus*, *guyanensis*, *punctipleura* and perhaps *lutzi* and *corpulentus* belong here. The abdomens generally lack any pattern beneath.

The *pellucidus* group contains species with very narrow frons convergent below, threadlike black callus, abdomen generally with a broad dark pilose median stripe below and often median and dorsolateral pale spots dorsally. The wings have first posterior cell often narrowed or closed, antennae black and usually with a prominent dorsobasal tooth. Species included are: *pellucidus*, *amazonensis*, *augustifrons*, *discus*, *crassicornis*, *xuthopogon*, *discifer*, *nematocallus* and probably *fuscus*.

The *fortis* group. This appears to include but 3 species, *fortis*, *casteetus* and *aaptus*, with similar narrow frons and head characters, patternless abdomens, no prescutellar spot, and brown tinted wings. All 3 are large stout species with entirely orange antennae. *T. itaituba* may go here also, though its slender long spined antennae are rather distinctive.

The *indecisus* group contains only *indecisus* and *antunesi*. Both have a distinct round basal callus, slender black antennae, bicolored legs and bicolored fore tibiae, and abdomens with a middorsal row of pale pilose triangles.

The remaining 3 species, *duckei*, *humboldti* and *aurora*, do not seem to belong in any of the groups above, nor to be clearly related to each other.

Names of museums where type material is to be deposited are abbreviated as follows: British Museum (Natural History) London, England: B.M.; National Museum of Natural History, Washington, D.C.: U.S.N.M.; Museum of Comparative Zoology, Cambridge, Mass.: M.C.Z.; Instituto Nacional de Pesquizas da Amazonia, Manaus, Brasil,: I.N.P.A.; Museu Paraense Emilio Goeldi, Belem, Pará, Brasil,: Mus. Goeldi; Florida State Collection of Arthropods, Gainesville: F.S.C.A.; American Museum of Natural History, New York: A.M.N.H.; California Academy of Sciences, San Francisco: C.A.S.

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KEY TO FEMALES

1. Frons very narrow and convergent below, frontal index 10 or greater, divergence index greater than 1.7. Frontal callus a slightly clavate ridge. At least third antennal segment wholly velvety black. No appendix at fork of third vein 2

Frons broader, index generally less than 8, and without the above combination of characters 10

2. First posterior cell of wing open, at most slightly narrowed towards wing margin 3

First posterior cell strongly narrowed, closed or petiolate. Wings heavily fumose or veins brown margined 8

3. Wings hyaline, at most the costal cell faintly yellowish to orange 4

Wings brownish tinted or the veins brown margined or basal 2/3 of wing blackish. Costal cell strongly yellowish to brown 5

4. Antennal tooth long, several times longer than its basal width. Prescutellar black spot prominent, margined

laterally with white hair tufts. Abdomen with 3 rows of prominent white pilose spots. Costal cell hyaline, not tinted . . . . amazonensis

Antennal tooth short, not longer than its width at base. Prescutellar black spot obscure, without prominent lateral white hair tufts. Median abdominal white pilose spots weak, often not evident, dorsolateral spots small but prominent. Costal cell yellow to orange, clearly contrasting with rest of wing . . . . angustifrons

5. Beard and pleural pilosity yellowish to orange brown 6

Beard and pleural pilosity white to gray 7

6. Wings with basal 2/3 to end of discal cell dark brown to black, with centers of some cells paler. Third antennal segment often reddish basally. Mesonotum and scutellum with abundant orange hairs. Abdomen black with prominent white pilose dorsolateral spots, but median triangles faint or absent. Frontal index often less than 10 . . . . . . discifer

Wings faintly brownish tinted, the costal cell yellow to orange, but no extensive basal black coloring. Third antennal segment wholly black. Mesonotum and scutellum brown with brown pollinosity and yellowish hairs. Abdomen brown, black haired, with or without median and dorsolateral yellow to orange pilose spots . . . . xuthopogon

7. Abdomen brown, black haired, at most faint vestiges of pale hair fringes on hind margins or elongate median pale pilose triangles, but without dorsolateral spots . . . . discus

Abdomen brown to black, with large and prominent pale pilose round dorsolateral spots and smaller pale pilose median triangles on at least terga 2 to 5 . . . . crassicornis

8(2). Abdomen dark brown to black, bluish pruinose. Beard and pleural pilosity yellow to brown. Abdominal pale pilose markings limited to dorsolateral spots on terga 2 to 5, often absent. Dorsal antennal tooth often longer than width at base. Antennae sometimes brown. Frontal index generally less than 10 . . . . fuscus

Beard and pleural pilosity gray to white. Median dorsal abdominal triangles often present. Frontal index very seldom less than 10 9

9. Legs, thorax and abdomen with brown integument, the scutellum often reddish apically. Pale pilose abdominal spots large, both median and dorsolateral spots equally prominent in undenuded specimens . . . . pellucidus

Legs, thorax and abdomen with black integument. Pale pilose abdominal spots reduced, the median spots often absent, the dorsolaterals small, weak and often evident only on terga 3 to 4, rarely wholly absent . . . nematocallus

10(1). Proboscis unusually long, nearly head height, the stylets at least twice length of palpi, the latter long, flattened and with an acutely drawn out apex. Wings with a dark pattern, sometimes faint. All legs entirely black 11

Proboscis not greatly exceeding palpi, or if so, then palpi short, legs not wholly dark or a dark pilose spot on prescutellum 16

11. Abdomen without conspicuous white median triangles; at most with vestiges of pale hairs on first and second terga. Sterna orange or yellow pilose. Wing with at most costal cell, basal cells and a streak along R_{2+3} to fork more or less infuscated. Mesonotum not conspicuously striped 12

Abdomen with conspicuous white dorsal markings; ventrally white or black and white pilose. Wings with a more extensive dark pattern, at least with dark clouds at ends of basal cells. Mesonotum with white stripes or spots . . . 13

12. Frons narrower, index ± 6. Prescutellum with a small black pilose patch, bounded laterally with short orange hairs. Scutellum with orange hairs laterally and apically, otherwise dorsal surface of brown mesonotum and abdomen wholly black pilose contrasting with orange pilose abdominal venter . . . . *piceiventris*

Frons broader, index 5.6. Prescutellum without such a black pilose patch. Mesonotum with faint pale pollinose patches at ends of transverse sutures. Abdomen with faint vestiges of orange mid-dorsal pilose triangles on at least first 2 terga but venter black pilose . . . . *subviolaceus*

13(11). Scutellum dark brown, dark pollinose and black pilose. Wings with costal and basal cells and all veins at base of wing including those at apex of basal cells more or less infuscated. Mesonotum with 3 slender whitish stripes and white hair tufts on margins of mesonotum posterior to wing bases. Abdomen with a middorsal row of small white pilose triangles on terga 1 to 5, largest on 4, and with more or less evident white pilose posterolateral angles of terga 1 to 4 . . . . *basilaris*

Scutellum extensively white pilose. Wings with a conspicuous dark pattern. Mesonotum and abdomen with more extensive white pattern 14

14. Scutellum entirely white pollinose and pilose. Frons broader, index less than 5.5 15

Scutellum basally blackish, only margin white. Frons narrower, index greater than 6.5. Mesonotum brown, margined with white pilosity and with 2 narrow faint whitish dorsal stripes. Abdomen with small white pilose triangles on terga 1 and 2, 4 to 6, that on 4 much larger than the others. Wing light brown in basal and anal area and distal to end of stigma, fork, and discal cell, leaving area between ends of basal cells and fork of third vein and end of discal cell transparent. All crossveins surrounded by much darker large blackish clouds . . . . *xenorhynchus*

15. Frons broader, index 4.3-4.6. Mesonotum blackish with a broad median white pollinose and pilose stripe the width of scutellum covering its whole length. Abdomen with terga 1 wholly white pilose, terga 2 and 4 with large white median triangles the length of their segments, 3, 5 and 6 with smaller white triangles and all terga with narrow white hind margins broadened at sides to nearly length of segments. Wings hyaline with dense black spots on all crossveins, a spot near apices of marginal and first submarginal cells, and small discrete spots in middle of discal cell and all posterior cells. . . . . *sannio*

Frons narrower, index 5 or greater. Mesonotum all white pilose with a faint broad middorsal dark streak. Abdomen black above and below with a white trapezoid dorsally on tergum 4 only. Wings basally infuscated to end of stigma and with a spur to fork of third vein. Discal and 2nd basal cells subhyaline centrally . . . . *unimacula*

16(10). With a well marked black pilose prescutellar spot framed laterally with tufts of paler hair and/or pollinosity 17

Without such a spot 26

17. Wings with strong dark clouds surrounding all crossveins and fork of 3rd vein. First posterior cell more or less strongly narrowed or coarctate but not closed. Fore tibiae bicolored, paler at base than apex and remaining tibiae paler, at least basally, than respective femora. Abdomen brown with a more or less complete middorsal integumental black stripe or series of spots and whitish dorsolateral oblique pilose dashes . . . . *ornativentris*

Wings at most with veins diffusely brown margined, or darker basally or fork with small and weak cloud 18

18. Abdomen, when undenuded, dorsally without median or dorsolateral pale pilose spots, patches or median triangles . . . 19

Abdomen when undenuded with discrete pale pollinose markings and sometimes also with dark integumental markings 21

19. Antennae with a long forward pointing dorsal spine on basal plate. Wings uniformly light brown. Proboscis but slightly exceeding palpi. Pleura with conspicuous black hair tuft below wing base. Abdomen black, bluish pruinose, black pilose, the posterolateral corners of terga 1 to 4 or 5 with creamy hair tufts. . . . . *punctipleura*

Antennae with at most an acute dorsal angle. Proboscis much exceeding palpi. Pleura with at most a weak dark hair tuft. . 20

20. Abdomen with integument light to dark brown, occasionally with a black streak on first 2 terga, wholly black pilose dorsally, orange to yellow pilose ventrally. Antennae very dark brown to black. Pleura and beard yellowish gray to black. Wings with basal and costal cells, area below stigma and a streak along 3rd vein to fork more or less blackish infuscated . . . . *piceiventris*

Abdomen orange brown in ground color, dorsally orange pilose except in the middle of terga 4 to 7, where the pilosity is increasingly black. Pleura and beard yellowish brown, legs black, antennae orange with dusky style, callus clavate, wings clear, slightly brown tinted in costal cell and basally . . . . *lutzi*

21(18). Abdomen light yellow to leaf green in ground color with a faint median and a pair of dorsolateral pale haired stripes or rows of spots. Legs yellowish brown. Wings glass clear or the veins weakly brownish margined. Mesonotum pale gray pollinose . . . . *olivaceiventris*

Abdomen not green, usually with an obvious pattern of pilosity 22

22. Abdomen with a middorsal black pilose stripe which may be underlain by a dusky integumental stripe or series of spots. Broad interrupted dorsolateral stripes or rows of orange pilose spots on terga 1 to 5 or 6 are bordered outwardly by black pilose stripes and extreme lateral borders of terga 1 to 5 pale pilose. Palpi extremely short and broad. Wings with faint cloud at fork and more or less infuscation below stigma . . . . *importunus*

Abdomen with at least vestiges of pale pilose median triangles 23

23. Mesonotum with a dorsolateral pair of dark stripes or abdomen with large and conspicuous white pilose median triangles. . 24

Mesonotum not conspicuously striped and median abdominal triangles small, inconspicuous or yellowish 25

24. Wing glass clear. Mesonotal stripes faint. Abdomen with a median row of short equilateral white pilose triangles and broad dorsolateral white pilose stripes from terga 1 to 5 or 6. Legs entirely pale, white pilose. Palpi white, wholly white pilose . . . . *comosus*

Wing with costal cell orange, calypters and basal cells dusky. Mesonotal dark stripes conspicuous. Abdomen with tall, conspicuous white median triangles on terga 1 to 4 and slender interrupted white pilose dorsolateral stripes. Legs dark brown to black, mainly black pilose. Palpi yellowish, often partially black pilose . . . . *guyanensis*

25(23). Mesonotum and scutellum with blackish integument, slightly bluish pollinose. Abdomen dark brown with nearly always a black integumental median triangle on first 2 terga. All femora usually black, contrasting with reddish tibiae. Wings smoky, the costal cell orange, but no spot at fork of 3rd vein. Median abdominal triangles yellow, slender, nearly forming a stripe. Dorsolaterals a row of orange pilose spots. Frons parallel sided or slightly narrowed above . . . . glaucus

Mesonotum and scutellum with reddish brown integument, light brown pollinose. Abdomen brown, usually without a well marked dark integumental streak on terga 1 and 2. Femora usually not or but little darker than tibiae, sometimes the fore pair black, rarely all tibiae more or less black. Wings as in glaucus, but nearly always a small cloud at fork of third vein, and the costal cell hyaline. Abdomen as in glaucus but middorsal triangles broader and fainter, dorsolateral orange spots larger, rarely confluent. Frons widened above, divergence index greater than 1.10 . . . . nebulosus

26(16). Abdomen with a conspicuous middorsal row of large yellow pilose triangles, nearly contiguous from terga 1 to 4 or 5, and fainter yellow pilose dorsolateral stripes from terga 2 to 6. Legs obscurely bicolored, femora blackish, tibiae reddish. Fore tibiae basally nearly white. Wings smoky. Third antennal segment black. . . . . indecisus

Abdomen at most with small inconspicuous median hair tufts 27

27. Abdomen with small, easily lost, median pale hair tufts or triangles on at least terga 1 to 4 28

Abdomen without contrasting median triangles 30

28. Antennae orange, the style dusky, basal plate broad with a strong dorsal angle or short tooth. Mesonotum and scutellum blackish; abdomen orange brown, the median triangles dull yellowish on terga 1 to 6, easily lost. Beard and pleura white pilose . . . . humboldti

Antennae black 29

29. Antennae slender, the dorsal tooth close to base of plate. Median orange abdominal hair tufts on terga 1 to 4 only. Beard and pleural pilosity yellow to brown . . . . . . antunesi

Antennae with a strong, curved dorsal spine. Median white abdominal hair tufts broad, on terga 1 to 6 . . . . . . duckei

30(27). Antennae orange, the style dusky, slender, with a long forward projecting dorsal spine. Whole insect orange brown and all pilosity dark yellow. Wings evenly pale brown . . .itaituba

Antennae and body not as above. 31

31. Wings with costal cell orange, basal cells and calypters lightly infuscated, rest of wing hyaline. Whole insect reddish brown 32
Wings evenly fumose or all veins broadly brown margined . . . 33

32. Antennae with a strong dorsal angle or sharp tooth near base of basal plate. Frontal callus long oval, generally separated from the slender ridge-like median callus by a pollinose gap. . . . . corpulentus
Antennae with a weak dorsal angle near middle of basal plate. Frontal callus a gradually tapering ridge with no distinction between frontal and median callus . . . . aurora

33(31). Wings with all veins broadly brown margined. Antennae orange, the dorsal angle obtuse. Abdomen dark brown, bluish pruinose, black pilose above and below except for hind margins of all terga and sterna coppery red pilose, as is rest of insect including beard and palpi . . . . . casteetus
Wings lightly and evenly fumose. Beard not red 34

34. Beard and pleural pilosity very dark brown. Femora dark brown, black haired, tibiae paler, red haired. Abdomen nearly black, black pilose except for narrow dark red pilose hind margins on all segments. Wings with venation normal, dark smoky. Thorax and scutellum very dark brown . . . . fortis
Beard and pleural pilosity yellowish white to gray. Femora black, tibiae yellowish to reddish. Abdomen as in fortis, except the pale pilosity orange to yellow. Wing less darkly fumose, the fork of third vein with a short but constant appendix. Thorax and scutellum as in fortis, except marginal pilosity gray rather than black . . . . aaptus

SPECIES DISCUSSION

TABANUS AAPTUS n. sp. (Fig. 29, Map 5)

A large dark brown species with slender orange antennae, whitish beard, bicolored legs and lightly tinted wings with a short appendix at fork of third vein.

Female. Length 20 mm., of wing 17 mm. Eyes bare, color or pattern not recorded. Head structures as figured. Frons yellowish brown pollinose, darker at vertex. A strong occipital fringe of unevenly sized strong black spines. Callus reddish brown, its upper extension black. Subcallus orange gray pollinose, wrinkled, becoming grayer on frontoclypeus and genae. Hairs of face and beard pale gray with a few blackish hairs at sides of antennal insertions. Antennae orange, the scape gray pollinose, both scape and pedicel with strong black dorsal setae, finer, sparser and paler hairs below. Third segment orange, the annuli darker, nearly black. Palpi light orange, thinly pollinose, the basal segment white pilose, the distal segment short black pilose. Proboscis less than head height, blackish, membranous, the labella long as palpi.

Mesonotum with integument blackish brown, the notopleural lobes and sides of scutellum reddish. Vestiture of gray pollinosity, faintly striped, erect black hairs and semi-recumbent dull orange hairs, the latter also forming faint stripes. No tuft of black hairs between mesonotum and scutellum, but a small tuft of gray hairs just behind wing bases. Pleura dark, light gray pollinose and white or pale gray pilose. Coxae and femora black, the first white haired, the last dorsally black haired, ventrally long white haired, the apices of mid and hind femora yellowish. Tibiae orange brown, the fore pair yellow haired except at apex, the 2 hind pairs dark haired. All tarsi dusky. Wings with costal cell orange, rest of wing lightly tinted, especially in basal cells and below the yellow stigma. Fork of third vein with a short appendix, rarely longer than the subtending vein segment. First posterior cell slightly narrowed. Halteres with orange stem and ivory white knob.

Abdomen with dark orange brown integument, clothed dorsally with blackish pollinosity and short black pilosity except for narrow fringes of bright copper colored hairs on hind margins of terga 1 to 6. Beneath the integument seems paler due to whitish pollinosity. The terga are sparsely dark pilose and with broader hind marginal bands of paler yellow hairs.

Holotype female, Brasil, Amazonas, vic. Manaus, Reserva Ducke 17-VIII-1981, flight trap, Fairchild, Rafael and Gorayeb colls. To be deposited in I.N.P.A.

Paratypes 26 females, same locality and collectors, 22-VII and 14, 17-VIII 1981, all but one taken in a flight trap. The paratypes are very similar but vary somewhat in size, from 17 to 20 mm, with wing lengths of 14 to 16.5 mm. Wings also vary somewhat in intensity of infuscation, a few having the veins quite noticeably brown margined.

A single male (Allotype) taken with the paratypes is quite puzzling, as its coloring is much like fortis. It seems the males are more similar than the females in this pair of species.

Male. Length 21 mm., of wing 16.5 mm. Eyes bare, holoptic, the color or pattern not recorded. Upper facets well differentiated from lower, but not sharply demarcated, occupying a central patch of about 1/2 total eye area. Head structures as figured. A small scale-like tubercle sunk between the eyes at vertex. Pollinosity of frontal triangle orange brown, darker than in holotype of aaptus, about as in females of fortis. Pollinosity of frontoclypeus and genae dark brownish gray, the beard dark brown. Antennae orange, more slender than in female, only the terminal annulus black. Palpi dark reddish brown, black pilose. Coloration of body, legs and wings about as in female aaptus except that pollinosity of pleura is darker gray, and pilosity of pleura and legs is orange brown where it is white or gray in female aaptus. Abdomen is quite pointed, with color and vestiture dorsally as described for female, though light pilosity is sparser and darker. Beneath the abdomen appears darker due to lack of pale pollinosity and denser and more extensive black pilosity. The wings have a trace of an appendix in the right wing, none in the left. The damaged male mentioned in the discussion of T. fortis differs from the male here described in having no vestige of an appendix at fork of third vein, in having all legs with integument dark reddish, but pilosity of femora black, of tibiae reddish to yellow, rather than integument of femora black, tibiae red as in aaptus. There is no hint of gray pollinosity on pleura or coxae in this specimen, and I believe it is the male of fortis.

The name is from Greek aaptos, invincible, to indicate its close relationship with fortis.

T. aaptus differs from T. fortis in slightly smaller average size, whitish beard and pleural vestiture, presence of a short appendix at fork of third vein, less heavily tinted wings, and the pale pilosity of legs and abdomen is consistently paler, whitish to orange rather than deep reddish. The basal plate of antenna is also more slender and lacks the ventral angle generally present in fortis. The legs in both species are more or less bicolored, but in aaptus this is due largely to the color of the integument, while in fortis it is due largely to the color of the vestiture.

TABANUS AMAZONENSIS (Barretto) (Fig. 1, Map 10)

Lophotabanus albopruinosus Kröber 1930, Zool. Anz. 90(3-4):85-86, female, Brasil.

Tabanus (Lophotabanus) albopruinosus Kröber 1934, Rev. Ent. 4(2-3):295. Fairchild 1966, Stud. Ent. 9(1-4):362. Not Tabanus (Ochrops) albopruinosus Szilady 1923, Biol. Hung. 1:6.

Chelommia amazonensis Barretto 1949, Rev. Brasil. Biol., 9(1):41-43, figs. 4-6, female, Brasil, Amazonas, Manaus.

Tabanus amazonensis: Fairchild 1971, Cat. Dipt. Amer. S. of U.S., 28:99, as syn. of T. pellucidus Fab.

A large blackish species with very narrow frons, a long dorsal spine on black third antennal segment, a small black pilose prescutellar spot framed laterally by prominent white hair tufts, largely brown legs, faintly fumose to nearly hyaline wings with first posterior cell only slightly narrowed, black pilose abdomen with 3 rows of small white haired spots above, mainly white pollinose and pilose beneath, but with a faint dark pilose median longitudinal broad stripe or series of patches, absent in some denuded specimens. Old and faded specimens become purplish brown. The eyes are greenish black in life, without pattern. The species can be separated from others of the pellucidus group by the long dorsal antennal spine, prominent white hair tufts on each side of prescutellum and hyaline costal cell. I have a series from Reserva Ducke near Manaus and Campina Reserve n. of Manaus, taken in flight traps in August 1981 and 1 from Reserva Ducke, 30-VI-1970, T. Pimentel coll. An old specimen from Javareté, XI-1934, E. Amazonas was determined as this species by me in 1952. Barretto (l.c.) reports it also from São Gabriel, on the upper Rio Negro. I have seen Kröber's poorly preserved types but not those of Barretto.

TABANUS ANGUSTIFRONS Macquart (Fig. 2, Map 10)

Tabanus angustifrons Macquart 1847 Dipt. Exot. Suppl. 3:12, female, Cayenne.

Tabanus alboater Walker 1850, Newman's Zoologist 8, App. p. LXVII, female, Brasil. Fairchild 1956, Smiths. Miscell. Coll. 131(3):40. Philip 1960, Proc. Calif. Acad. Sci. 31(3):98.

Tabanus atricornis Bigot 1892, Mem. Soc. Zool. France, 5:638, female, S. America. Not Meigen 1838. Fairchild 1956, Smiths. Miscell. Coll. 131(3):10, 11. Syn. of alboater Walk.

A species closely similar to T. amazonensis, differing mainly in the shape of the black antennae which do not have the long dorsobasal tooth or spine found in amazonensis. The wings are hyaline, but costal cell yellowish, the legs are largely black to dark brown, especially the femora, and the mid abdominal dorsal pale hair triangles are smaller and less evident than in amazonensis, though the dorsolateral spots are clearly present. The prescutellar black spot is also less evident and the prominent white hair tufts are missing or represented by short yellowish hairs. I have a specimen from Brasil, Amazonas, Rio Branco, Sororoca, 1-IX-24, determined as alboater Walk. by J. Bequaert which was compared and found to agree with the type of angustifrons in London in 1953, but since the type is poorly preserved, lacking antennal styles, some doubt remains. I believe alboater is the same, based on a female from Pebas, Peru, which I compared with the type of alboater in B. M. in 1964 and found to agree closely. The specimen certainly belongs to the same species as the one found to agree with the type of angustifrons in 1953. The eye in life is black with greenish reflections. Philip (l. c.) came to the same tentative conclusion although he had not compared angustifrons.

I have studied the following specimens: Peru, Loreto, Pebas no date, 1 female; Loreto, Iquitos, 13-III-64, B.K. Dozier coll., 1 female; Brasil, Amazonas, Rio Branco, Sororoca, 1-IX-24, J. Bequaert, 1 female; Pará, 10 Km. N. Bragança, 10-VII-81, netted, I.S. Gorayeb coll., 1 female; Pará, vic. Belém, 17-22-VI-77, malaise trap, 2 females; Belém, APEG forest, 29-VII to 6-VIII-74, flight trap, D.G. Young, 1 female; Colombia, Meta, Rio Vaupes, Lago El Dorado, XI-68, F. Medem coll., 1 female; Guyane Francaise, Natoury, 18-VIII-79. Raymond leg., 1 female.

TABANUS ANTUNESI n. sp. (Fig. 22, Map 5)

A plain brown species with lightly tinted wings, slender black antennae, and a middorsal abdominal row of small orange haired triangles.

Female. Length 19 mm., of wing 17 mm. Eyes bare, color in life unrecorded. Head characters as figured. Frons orange brown pollinose with rather abundant short decumbent dark brown hairs between median callus and vertex. A strong occipital fringe of stout short black setae is present. Frontal and median frontal calli black and a small partly denuded spot in place of an ocellar tubercle. Subcallus, frontoclypeus and genae yellowish gray pollinose, with a small patch of curved orange hairs below antennal bases and short sparse hairs on upper genae. Beard pale reddish. Antennal scape and pedicel dark brown, grayish pollinose, densely beset with black setae. Third segment entirely velvety black. Palpi pale brown, almost wholly short black pilose, with but a few pale hairs. Proboscis nearly head height, the theca and labella black, membranous.

Mesonotum with dark reddish brown integument, thinly orange gray pollinose and beset with semi-erect black hairs and recumbent orange hairs. The sutures are faintly paler and the notopleural lobes concolorous with dorsum, the latter with dense erect black hairs. Scutellum reddish brown, orange and black haired, and with small tufts of pale hairs above wing bases. Wings hyaline, faintly grayish with faint brownish shades along main veins. Venation normal, a strong angle at fork of third vein and first posterior cell broadly open. Basicosta setose. Stigma yellow. Haltere with brown stem, yellow knob. Pleura and coxae gray pollinose, pale straw colored pilose.

All femora dark brown, dorsally short black pilose, ventrally long pale pilose. Tibiae lighter reddish brown, the fore pair faintly bicolored, with pale hairs basally, black apically. Remaining tibiae reddish pilose, all tarsi blackish. The short outer hind tibial fringe is black.

Abdominal integument concolorous with that of thorax. Dorsally the terga are thinly brown pollinose and densely short black pilose, except for very small dark orange hair tufts on the middle of the hind margins of terga 1 to 4 and a few yellow hairs on extreme posterolateral margins of terga 3 and 4. Beneath the sterna are largely yellow pilose, but with the centers of all segments black pilose, resulting in the appearance of a broad midventral dark pilose band or stripe.

Holotype female, Ilhéus, Bahia, Brasil 18-VIII-1934, A-32, P.C.A. Antunes coll. Holotype and some paratypes to be deposited in Museu Goeldi.

Paratypes 12 females, same locality and collector, Nos. A-31, A-32 and A-34. The paratypes vary from 16 to 20 mm., but are quite uniform otherwise. The orange middorsal hair tufts are easily lost and not evident on rubbed specimens.

This species is very similar to *T. indecisus*, having the head structures practically identical. *Indecisus*, however, has large yellow to whitish pilose middorsal abdominal triangles and generally dorsolateral pale spots and pale pilose hind tergal margins. The species is named for Dr. Paulo C. de Azevedo Antunes, the collector of this and many other interesting haematophagous insects.

TABANUS AURORA Macquart

Tabanus aurora Macquart 1838, Dipt. Exot. 1(1):142(138), female, Brasil. Fairchild 1967, Pacific Ins. 9(2):244, fig. 2. Syntypes in Paris.

I have seen no specimens other than the 2 syntypes in Paris. The specimens reported as *aurora* by Bequaert (1926) and Kröber (1929) were apparently *Phaeotabanus innotescens* Walker, while specimens standing under *aurora* in Lutz collection belonged to 3 different species, only one of which agreed with my notes on the types and none of which were *innotescens* (Fairchild 1961). The original description is not diagnostic, referring only to color. My notes (l.c.) indicate a species resembling *T. fuscus* Wied., but with different antennae and frons. It can apparently be separated from *lineifrons* Lutz, whose antennae seem to be very similar, by not having an appendix at fork of third vein and by having red legs and antennae. The species is the type species of Lutz' genus *Odontotabanus*, as designated by Borgmeier (1933). The range is unknown, and neither of the syntypes bears any indication of locality, date or collector.

TABANUS BASILARIS Kröber (Fig. 13, Map 7)

Tabanus basilaris Kröber 1931, Konowia 10:291, female, Brasilien. Fairchild 1961, Mem. Inst. Osw, Cruz 59 (3):293; 1966, Studia Ent. 9(1-4):372. Type in Vienna.

The species can be separated from other large dark species by the remarkably long proboscis, the stylets equalling head height, long pointed and flattened palpi, wholly black legs and yellowish white halteres. It belongs structurally to a small group which includes *T. xenorhynchus* Fchld., *T. subviolaceus* Fchld., *T. sannio* Fchld. and *T. unimacula* Kröb. It differs from *subviolaceus* in bearing a middorsal abdominal row of small white pilose triangles, having white hair tufts above the wing bases, more or less distinctly gray striped mesonotum, and pale hair patches at sides of at least first 4 abdominal terga. The abdomen also is white pilose beneath. The head characters are much like those figured by me for *subviolaceus* (Fairchild 1961), but the palpi are notably broader. All specimens seen aside from the type have been from São Paulo or Minas Gerais, taken in Dec. or Jan. A single male, Peru, Madre de Dios, Rio Tambopata Reserve, 30 km. S.W. Pto. Maldonado, 16-20XI-79, J. B. Heppner coll. seems to agree with the few available females, though the great distance from other known localities for the species renders the identification tentative.

TABANUS CASTEETUS nom. nov. (Fig. 24, Map 8)

Tabanus testaceus Macquart 1838, Dipt. Exot. 1(1):137, female, Cayenne. Fairchild 1956, Smiths. Miscell. Coll. 131(3):30; 1967, Pac. Ins. 9(2):251; 1971, Cat. Dipt. S. Amer. S. of U.S. 28:109, not recognized. Surcouf and Gonzalez Rincones 1912, Dipt. Vuln. Venez, 2 ieme partie, pp. 70, 71-72, fig. 41. Venezuela, Cagua. Not *Tabanus testaceus* Forskal 1775.

In 1964 I was able to compare specimens with the type in Paris, which is in very poor condition and completely denuded, as noted in the original description. My compared specimen is from Taracua, Rio Vaupes, Amazonas, Brasil, 3-1-1924, Melin coll. and agreed fairly well with the type, as far as condition of the latter allowed valid comparison. This is the specimen figured here. The species resembles a faded *T. fortis* Fchld., but has the wing veins broadly brown margined, halteres with pale knobs, all cells open, the abdomen bluish pruinose and antennae and frontal callus are both different. The legs are entirely reddish and red pilose, and, with the exception of a small tuft of golden yellow hairs beneath the wing base, all the pilosity of head and body is coppery red. The name is an anagram of *testaceus*.

The reference in Surcouf and Gonzalez-Rincones includes a figure, indicating an almost completely denuded specimen, but they include no additional descriptive matter, merely quoting Macquart's original description and saying they received a dozen specimens from Cagua, Venezuela, from Dr. Rangel. Kröber's reference (1930) to a type in B. M. refers to another species.

TABANUS COMOSUS Stone (Fig. 19, Map 8)

Tabanus comosus Stone 1944, Bol. Ent. Venezolana 3(3):134, female, Venezuela.

I have a topotype determined by Stone and 2 other females from Venezuela. The species is structurally much like *guyanensis* Macq., but smaller, grayer, with a strongly marked prescutellar black spot and broad white pilose median and dorsolateral rows of abdominal spots. Legs are pale yellowish, nearly wholly white pilose. Wings glass clear, the veins light brown.

TABANUS CORPULENTUS Brèthes (Fig. 26, Map 2)

Tabanus corpulentus Brèthes 1910, An. Mus. Nac. Buenos Aires 20:480 (preprint Dec.); 1911, Op. cit. Ser. 3, Tomo XIII, 480; 1921, Estudios 21(3 et seq.):67, female, Misiones Argentina. Coscarón 1979, Obra Cent. Mus. La Plata, 6:262-263, figs. 3G to 3K.

Tabanus neoinnotescens Kröber 1931, Konowia 10(4):299, female, Brasil. Fairchild 1966, Studia Ent. 9(1-4):373; 1971, Cat. Dipt. Amer. S. of U.S., fasc. 28:9, as syn. of *corpulentus*.

The above synonymy was based on comparison of a homotype of *neoinnotescens* from Villarica, Paraguay, with a specimen from the same locality determined as *corpulentus* by Coscarón. This is a large wholly reddish brown and rufous pilose species often confused with *T. fuscus* Wied. I have a specimen from Rio Tamandua, Rib. Preto, S. Paulo determined by Barretto as *T. impressus* Wied., a synonym of *fuscus*. The latter differs from *corpulentus* in being generally darker, with blackish abdomen, black antennae and legs, and in having the first posterior cell in the female wing always closed and usually petiolate, though in the males we have seen it is often narrowly open.

The male, hitherto undescribed, is readily associated with the female on color and size. The eyes are holoptic, bare, with a well demarkated area of enlarged facets occupying about 2/3 of total eye area and a small thin tubercle sunk between the eyes at vertex. The palpi are curiously spatulate. Whole insect is reddish brown, clothed with brown pollinosity and orange brown pilosity. The wings are clear, the costal cell and both basal cells yellowish tinted, the stigma yellow and first posterior cell wide open.

Plesiotype male, Brasil, São Paulo, San José dos Campos, XII-1954, H. S. Lopes.

I have seen the following specimens: Paraguay, Villarica, F. Schade, no date, 2 females; Brasil, Paraná, margem do Rio Piquiry 30-I-1918, 1 female; Paraná, Guairá, XI-1941, 1 female; Mato Grosso, Maracaju, Feb. 1937, 1 female; São Paulo, Ribeirão Prêto, Rio Tamanduá, Barretto and Zago coll., 10-XII-53, 1 female; São Paulo, S. José dos Campos, H. S. Lopes, XII-1934, 1 male.

TABANUS CRASSICORNIS Wiedemann (Fig. 7, 8, Map 11)

Tabanus crassicornis Wiedemann 1821, Dipt. Exot. 1:71; 1828, Auss. Zweifl. Ins. 1:130, female, Amerika. Fairchild, 1967, Pac. Ins., 9(1):96, fig. 18, syn. of *pellucidus* Fab. Philip 1960, Proc. Calif. Acad. Sci., Ser. 4, 31(3):97-98.

Chelommia melanocnemis Barretto 1957, Rev. Brasil. Malar. 8(1):83-84 (1956), ? in part.

This species is most similar to *pellucidus*, differing from that taxon in having the wings less strongly brownish and with the first posterior cell open, only slightly narrowed. The costal cell is strongly brown tinted. Wiedemann's description was drawn from an admittedly old specimen standing under the name of rufiventris in Fabricius' collection, and he did not know its provenance other than "Amerika." The name is not listed in Kröber's catalogue (1934) while Stone (1938, p. 164) mentions it as possibly nearctic, though he did not recognize it. My specimen compared and agreeing with the type in Copenhagen is from Surinam, and I think it likely that Wiedemann's type may also have been from that country, as much of Fabricius' material seems to have been from there. It is very probable that crassicornis is based on a faded specimen of pellucidus with the first posterior cell more than usually widely open. I have 2 pellucidus from Zanderij Id., Surinam and 2 crassicornis from Republiek, Surinam. Philip (1960) discussed this Copenhagen specimen, but without definitely placing it, though it is the second oldest name in the group.

Specimens at hand are from the following localities: Suriname, Republiek, Sept.-Oct. 1963, Geijskes coll., 4 females; Guyane Francaise, Acarouany, 2-IX-80, Raymond leg. 1 female; Brasil, Amapá, Serra do Navio, Sept.-Oct. 1957, J. Lane coll., 2 females; Pará, Belém, Utinga, 27 Nov. 1974, D. R. Roberts, 3 females; same loc., 21 Nov. 1974, 1 female, Pará, vic. Bacuri n. of Marabá, 26, 30 Oct. 1974, J. F. Reinert coll., 2 females.

TABANUS DISCIFER Walker (Fig. 3, Map 9)

Tabanus discifer Walker 1850, Insect. Saunders. Dipt. 1:35, pl. 2, fig. 2. Female, Para. Fairchild, 1971, Cat. Dipt. Amer. S. of U.S. 28:91, synonymy.

I have seen the types of all the names listed in synonymy in the catalogue. Kröber (1929) described and figured the male as T. guttiventris. The species is easily recognized by having the wings basally to end of discal cell largely blackish, usually with lighter areas in the centers of most cells and a dark extension to fork of third vein. The frons is narrow, like the rest of this group, the antennae black or dark brown with a strong dorsobasal tooth, though not as long as in amazonensis Barr. Mesonotum is black, but in undenuded specimens with abundant orange hairs. Notopleural lobes reddish, and scutellum often with reddish apex and margins. Beard and pleura yellowish to brown, never gray or white. Abdomen brown to black strongly bluish pruinose on anterior tergites, black pilose except for dorsolateral round white pilose spots on tergites 2 to 5. No median white triangles in most specimens, and when present they are small and faint. Legs black and abdomen beneath black with variably prominent sublateral white stripes. The male is similar, more brownish in integument and the antennae brown with black style, eyes bare, holoptic, the large facets well differentiated and demarcated, occupying about 1/2 eye area. The female eye in life is said to be dark greenish with reddish highlights, without bands. Most of my material was taken in flight or malaise traps, a few biting cattle at dusk, the male at light. The distribution of specimens before me is shown on map no. 9.

TABANUS DISCUS Wiedemann (Fig. 6, Map 12)

Tabanus discus Wiedemann 1828, Auss. Zweifl. Ins. 1:123-124, female, Brasil. Fairchild 1967, Pacific Ins. 9(1):96-97, fig. 19, synonymy; 1971, Cat. Dipt. Amer. S. of U.S. 28:91.
Chelotabanus discus: Kröber 1932, Rev. Ent. 2(3):294-295, discussion not based on type; 1934, Rev. Ent. 4(2):261.
Tabanus rufoniger Walker 1850, Ins. Saunders., Dipt. 1:66, female, unknown locality. Fairchild 1967, Pac. Ins. 9(2):251, synonymy.
Lophotabanus communis Kröber 1930, Zool. Anz. 90(3-4):83, female, Surinam. Fairchild, 1966, Studia Ent. 9(1-4):362, synonymy.
Tabanus cervinus Kröber 1929, Ann. Naturhist. Mus. Wien, 43:254, 255, fig. 13, female, Santarem, Para, Brasil. Fairchild 1966, Studia Ent. 9(1-4):372. (New synonymy).
Tabanus infuscatipennis Surcouf, 1919, Miss. Serv. Geogr. Armee. Mes. Arc Meridien Equatorial, 10(2):230, nomen nudum. Fairchild 1967, Pac. Ins. 9(2):247.
Chelommia melanocnemis Barretto 1957, Rev. Brasil. Malariol. 8(1):83 (1956) female, Rio Negro, Brasil and Br. Guiana. ? in part.

A large species with very narrow frons, black antennae, grayish black mesonotum, white beard and pleura, black legs and plain brown abdomen without conspicuous pale dorsal markings. There is a small prescutellar dark spot and a pair of white pilose stripes on the abdomen beneath. The wing veins are more or less conspicuously brown margined, there is no appendix at fork of third vein and the first posterior cell is at most slightly coarctate. The eyes in life are greenish black, without pattern. In a few exceptionally well preserved specimens a faint row of narrow white haired middorsal triangles nearly forming a narrow stripe may be seen, or there may be a few pale hairs on the hind margins of one or more tergites. I have not seen males of this species.

T. discus differs from other members of the pellucidus group chiefly in the almost total absence of pale pilose markings on the brown abdomen above. Distribution, based on specimens actually seen, is shown on the accompanying map. The Trinidad and Venezuela localities in Fairchild (1971), though quite likely, cannot now be confirmed and are omitted from the map.

I have a specimen from Surinam compared and agreeing with a paratype of melanocnemis Barr. from Br. Guiana in B.M., but it does not agree well with the original description. Unfortunately, Barretto does not mention the condition of the first posterior cell and does not figure the species, nor does he mention the condition of his specimens. I believe that at least the Guyana paratypes may be what is here called T. discus Wied.; the holotype from Rio Negro may be different, but I have not seen it. My compared specimen from Surinam was also compared and found to agree with the types of rufoniger Wlk., communis Kröber, and the undescribed infuscatipennis Surcouf.

A specimen from Iquitos, Peru, which I thought was in only fair agreement with the type of cervinus Kröb. in Vienna in 1964, differed from the type in having yellowish brown beard and pleura, while in the type these are whitish. Another compared specimen from Pará differed in having the abdomen beneath all dark haired, lacking the white pilose stripes of the type. I now feel that *cervinus* is but a specimen of *discus* with the median pale triangles better preserved than usual.

My notes on the type of *rufoniger* indicate that first posterior cell is "practically closed at wing margin," i.e. very narrowly open. This is probably but an extreme variant, as all other characters seem to agree with *discus*.

Kröber's redescription of the species (l.c. 1932) was not based on the type in Berlin, but on a specimen thought to be determined by Bischoff in Vienna. This specimen was not *discus* in the present sense, as it had both a closed and stalked first posterior cell and white spots on the abdomen above. The type and my material would key to *impressus* in the key furnished by Kröber in this publication. This misdetermination may have been the reason for Kröber's proposals of *cervinus* and *communis*, both of which seem to have been based on slight variants of *discus*. Specimens I had compared with the type of *cervinus* differed from both *discus* and Kröber's type in having yellow pilosity, and I now believe they represent a different species, described herein as *xuthopogon* n. sp.

TABANUS DUCKEI n. sp. (Fig. 23, Map 6)

An inconspicuous brownish species with black antennae, bicolored fore tibiae, lightly tinted wings, ridge-like or clavate frontal callus and median pale hair tufts on abdominal tergites 1 to 5.

Female. Length 18 mm., of wing 16 mm. Eyes bare, the color and pattern not recorded. Head structures as figured. Frons yellowish gray pollinose, the callus reddish brown. Occipital fringe of short black setae. Subcallus, frontoclypeus and genae with orange brown integument, yellowish gray pollinose, appearing more reddish than frons. Beard white. Scape and pedicel of antennae reddish brown, pollinose, densely black setose. Third segment velvety black, only extreme base of plate dark reddish. Palpi pale orange, pale pollinose, almost wholly dark haired, even the first segment. Proboscis nearly head height, the labella as long as palpi, both theca and labella dark brown, fleshy.

Mesonotum with dark brown integument, the sides including notopleural lobes and scutellum reddish and with a small pale spot at ends of the transverse sutures. Dorsal vestiture is of thin gray pollinosity, abundant erect black setae and sparse recumbent yellow hairs. There is a small but dense tuft of short white hairs just posterior and dorsal to wing base, but no vestige of a scutellar or prescutellar dark spot. Pleura white pollinose and with rather sparse long white hairs which also clothe the coxae. Fore coxae and femora nearly black, tibiae with basal 2/3 yellow, short white pilose, distal 1/3 infuscated, black pilose as are tarsi. Mid and hind femora dark brown, white pollinose and white haired, the tibiae paler, reddish, also largely pale pilose but with a hind tibial fringe of dark hairs. Wings with venation normal, no appendix, the first posterior cell very slightly narrowed, the membrane weakly yellowish brown tinted, strongest in costal cell.

Abdomen above chestnut brown, thinly pollinose, the first tergite slightly bluish pruinose when viewed from behind. Dorsal vestiture is of erect black hairs except for short broad median posterior triangles of whitish hairs on tergites 1 to 6 which are underlain by triangles of whitish pollinosity. Extreme sides of tergites 1 to 4 are thinly whitish pilose, the remaining tergites black pilose. Beneath the sternites are thinly whitish pollinose with the posterior 1/2 white pilose, remainder black pilose.

Holotype female Venezuela Expedition, Territ. Amazonas, Mt. Marahuaca, N. slope, Benitez camp, May 1-25, 1950, J. Maldonado Capriles coll. In F.S.C.A.

Four female paratypes same data. Three female paratypes Serra de Cupaty, Rio Japurá (Caquetá) Colombia, perto da fronteira de Brasil, XI-1912, A. Ducke. To be deposited in Museu Goeldi, Belém and author's collection.

The paratypes vary in size, from 18 to 14 mm. with wing lengths of 16 to 12 mm. Those from Colombia are a little dusty and slightly faded, those from Venezuela somewhat rubbed and several lack antennae. The species resembles piceiventris but has a narrower frons, longer antennal tooth, evenly tinted wings, bicolored fore tibiae and pale abdominal triangles. It differs from lineifrons Lutz in broader frons and lacking an appendix on fork of third vein, and from lutzi Krob. in smaller size, black antennae and bicolored fore tibiae. The name is a MS name under which the 3 Colombian examples stood in the Lutz collection. These bear the numbers T-996, T-997 and T-998 and 1 will be deposited in Museu Goeldi with other Ducke material. It is eminently fitting that a Tabanus bear the name of the great naturalist who collected it and who supplied Lutz with most of his Amazonian material.

TABANUS FORTIS Fairchild (Fig. 28, Map 5)

Tabanus fortis Fairchild 1961, Studia Ent. 4(1-4):477, nom. nov. for T. robustus Kröber 1929.

Tabanus robustus Kröber 1929, Ann. Naturh. Mus. Wien, 43:254, fig. 12, female, Taperinha, 45 km. E.S.E. of Santarem, Pará, Brasil. Fairchild 1966, Studia Ent. 9(1-4):374-375, type seen.

Kröber's figure is somewhat exaggerated, the antenna of the type having a shorter dorsal tooth and less pronounced ventral angle than he shows. The species is a uniform dark brown all over, clothed with black and dark reddish pilosity. The tibiae are slightly paler than femora, partly due to paler pilosity. The antennae are orange to dark reddish, the style rarely dusky. Halteres with contrasting ivory white knob. Wings evenly smoky brown, no appendix and first posterior cell wide open. The species was quite abundant at Fazenda Morelandia, Mun. Benevides near Belém, Pará, Brasil, where large numbers were attracted to a horse in heavy forst for a short time near dusk. My colleagues and I also took specimens at Reserva Ducke near Manaus and at the Campina Research Station north of Manaus in flight traps in heavy forest. I have also studied specimens from Amapá, Brasil and from Surinam, Coppename river; British Guiana, Kartabo; and Guyane, Surcouf coll. One of the Kartabo specimens was determined by Kröber as Stigmatophthalmus sp. in 1925. Specimens bear dates from May to October. What I believe is the male is represented by a damaged specimen from Kartabo, B. G. lacking most of abdomen. Tinctorially it is like the female. The eyes are holoptic, with a poorly demarcated area of slightly enlarged facets occupying about 1/3 eye area and with a small tubercle sunk between the eyes at vertex.

TABANUS FUSCUS Wiedemann (Figs. 9, A, B, Map 9)

Tabanus fuscus 1819, Zool. Mag. 1(3):41, female, Brasil; 1821, Dipt. Exot. 1:68; 1828, Auss. Zweifl. Ins. 1:121, 556. Coscarón 1979, Obra Cent. Mus. La Plata, 6:263, fig. 3, L to O. Fairchild 1967, Pacific Ins. 9(1):97-98.

Chelotabanus fuscus: Kröber 1932, Rev. Ent. 2(3):294-295.

Tabanus piceus Thunberg 1827, Nova Acta Uppsala 9:55, female, Brasil. Philip 1967, Ann. Ent. Soc. Amer. 60(6):1235-1236, synonymy.

Tabanus bicolor Thunberg 1827, Nova Acta Uppsala 9:55, female, Brasil. Philip, 1967. op. cit. 60(6):1236, lectotype, synonymy (not *T. bicolor* Wied. 1821).

Tabanus impressus Wiedemann 1828, Auss. Zweifl. Ins. 1:126-127, female, Montevideo. Philip 1967, Ann. Ent. Soc. Amer. 60(6):1236. Fairchild 1967, Pac. Ins. 9(1):99.

Tabanus monochroma Wiedemann, 1828, op. cit. 1:555-556, female, Montevideo. Fairchild 1967, Pac. Ins. 9(1):100, synonymy, lectotype.

Tabanus clausus Macquart 1848, Dipt. Exot. Suppl. 2:17 (1847:33), female, Brasil. Kröber, 1934, Rev. Ent. 4(2):261, synonymy. Fairchild, 1956, Smithsonian Misc. Coll. 131(3):13.

Tabanus ferreus Walker 1848, List. Dipt. Ins. B.M. 1:150, male (actually female), Brasil. Fairchild 1956, Smiths. Miscell. Coll. 131(1): 16. Philip 1967, Ann. Ent. Soc. Amer. 60(6):1236, synonymy.

Chelotabanus ferreus: Kröber 1932, Rev. Ent. 2(3):299, type female London redescribed.

Tabanus erythraeus Bigot 1892, Mem. Soc. Zool. France, 5:687, female, La Plata. Kröber 1934, Rev. Ent. 4(3):311, syn. of *monochroma* Wied. Not *Atylotus erythraeus* Big. 1892 p. 661 Mexico. Fairchild 1956, Smiths. Misc. Coll., 131(3):15, syn. of *impressus* Wied.

There seem to be 2 closely similar taxa here, differing very little in structure in the female, but if my association of sexes is correct, clearly in the males. The above synonymy all refers to one species, so far as can be made out from study of the original descriptions and comments of authors, including my own notes on types. This species has an entirely black third antennal segment, when unfaded by age, with a long forward pointing dorsal tooth, dark brown to black and black haired thorax and abdomen, dark brown beard, black unicolorous legs, and the abdomen with small sparsely white pilose spots dorsolaterally on tergites 4-6 and with a pair of similarly white pilose stripes or rows of connected triangles ventrally. The wings are quite strongly tinted, especially the costal and basal cells and the first posterior cell is nearly always closed and petiolate, rarely narrowly open. The 3 males I have seen from Sta. Catarina are entirely very dark brown, black pilose, but with abdomens slightly bluish pruinose. There are no white hairs anywhere on their bodies, the wings are rather evenly yellowish tinted and first posterior cell is narrowly open in 5 wings, closed at margin in one. The eyes are bare, holoptic, but without discernable enlarged facets.

The other taxon I have so far been unable to match with any descriptions. It appears to have been included in several accounts as a variant of *fuscus*, but it is odd that none of the above listed synonyms agree with it. It differs from *fuscus* in being paler and browner overall, the wings more evenly and palely yellowish fumose, the antennae browner with a slightly shorter dorsal tooth and the abdomen brown, black haired, and with traces of middorsal yellow hair patches on tergites 1 to 3, laterally on 1 to 4 and ventrally in the form of sublateral broad stripes. The male has a well defined area of enlarged facets about 1/2 total eye area, brown slender antennae and vestiges of ventral yellowish pilose stripes on the abdomen. The palpi of the males of the 2 forms differ as figured (fig. 9). The wings of the females have the cell closed in 7 of the 8 available wings, narrowly open in 1. In the male the first posterior cell is very slightly narrowed. I refrain from naming this entity, if such it is, pending receipt of further and fresher confirmatory material. Of *fuscus*, I have before me the following material, all from Brasil. Three males, Nova Teutonia, Sta. Catarina, Jan. 1960, Plaumann; 4 females, S. Paulo. Boraceia Field Station, Jan., Feb., Mar. 1975, T. E. Rogers; 1 female, Rio de Janeiro, Oct. 1937; 1 female, Rio Tamandua, Ribeirão Prêto, S. Paulo, 28-X-54, Barretto coll.; 1 female, Paraná,Prainha 22-I-49; 1 female, Ilhéus, Bahia 18-VIII-1935. Of the other taxon, I have 1 male, Butantan, S. Paulo, 22-I-1918, A. Esteves; 1 female, Rio de Janeiro Oct. 1937; 1 female, Boraceia, São Paulo, 1-4 Mar. 1975, T. E. Rogers; 2 females, Sta. Catarina, Brusque and Florianopolis XII-1957, J. Lane. The two forms thus appear to be largely sympatric, but are shown by different symbols on Map 9. Coscarón figures female and genitalia; says male unknown.

TABANUS GLAUCUS Wiedemann (Fig. 20, Map 4)

Tabanus glaucus Wiedemann 1819, Zool. Mag. 3:43, female, Brasil; 1821, Dipt. Exot 1:69. Fairchild 1967, Pacific Ins. 9(1):98, synonymy, lectotype designation; 1971, Cat. Dipt. Amer. S. of U.S. 28:94.

Tabanus cinerarius Wiedemann 1828, Auss. Zweifl. Ins. 1:121-122. Lutz 1928, Est. Zool. Parasit. Venezolanas, Rio de Janeiro, 58, Pl. 9, fig. 9. Kröber 1931, Zool. Anz. 96:59-61, figs. 8, 9. (*Gymnochela*).

Tabanus tenens Walker 1850, Newman's Zool. 8, Appendix 1, p. LXV, female, Para. (Not *tenens* Walker 1850, Insect. Saunders., Dipt. 1:49).

Tabanus confligens Walker 1854, List. Dipt. Ins. B.M. 5, suppl. 1:213, 326, n.n. for *tenens* Wlk.

Tabanus (*Straba*) *grandis* Kröber 1931, Zool. Anz. 94(3-4):68, fig. 1, male, Bolivia, Prov. Sara. Fairchild 1966, Stud. Ent. 9(1-4):371-372, synonymy. (Not *Tabanus grandis* Szilady 1923).

The species is very similar to *T. nebulosus* but is darker, the palpi largely or wholly black pilose, the integument of mesonotum and scutellum black, the femora usually black or at least darker than tibiae, a strong blackish integumental triangle or streak nearly always present on first 2 tergites, small median yellowish pilose triangles usually present on most tergites as well as rounded yellow to orange pilose dorsolateral spots, and the wings never with the faint cloud usually present on the fork of third vein in *nebulosus*. In addition, the frons of *glaucus* is usually parallel sided or more often slightly narrower at vertex, a condition seen but once in *nebulosus*. Further discussion will be found under *nebulosus*.

Specimens are at hand from the Brasilian states of Pará, Mato Grosso, São Paulo and Rondonia, and from Bolivia, eastern Peru, eastern Colombia and Trinidad. It appears to be active in most months of the year. I have specimens compared and agreeing with both Wiedemann's and Walker's types.

TABANUS GUYANENSIS Macquart (Fig. 18, Map 1)

Tabanus guyanensis Macquart 1845, Dipt. Exot. suppl. 1:169(1846:41) Tab. 4, fig. 3, female, Guyane. Fairchild 1956, Smiths. Misc. Coll. 131(3):18, synonymy; 1961, Stud. Ent. 4(1-4):447, Amapá, Brasil; 1971, Cat. Dipt. Amer. S. of U.S. 28:94.

Tabanus flavibarbis Macquart 1845, Dipt. Exot. suppl. 1:169, female, Cayenne. Bequaert 1926, in Med. Rep. Hamilton Rice Seventh Exped. Amazon, etc., Chap. XV, Insecta, p. 231. Kröber 1929, Ann. Naturhist. Mus. Wien, 43:251-252, fig. 3, female, male, Taperinha 45 km. E.S.E. of Santarém, Pará, Brasil.

Atylotus rubrinotatus Bigot 1892, Mem. Soc. Zool. France 5:676, female, unknown locality. Fairchild 1956, Smiths. Miscell. Coll. 131(3):27, synonymy.

This large brown species is characterized by the brown bases of the wings with strongly infuscated calypters, gray striped mesonotum with usually strong tufts of white hairs on each side of scutellum, abdomen with large contiguous gray median triangles on tergites 2 to 4 and less distinct gray dorsolateral stripes on tergites 2 to 6. Krober (1929 c.) has described and figured the male. Material before me is mostly not well preserved, but is from the following localities. Brasil, Pará, Marajó Id., 1 female; Aurá, 1 female; Ilha das Onças, 1 female; Educandos, 1 female; Belém, 2 females; French Guiana, Cayenne, 1 male; Ecuador, Napo, Limoncocha, 1 female; Nueva Rocafuerte, 1 female; Peru, Madre de Dios, Tambopata Res. 7 females; vic. Pucallpa, 1 female; Bolivia, Riberalta, 1 female; Colombia, Amazonas, 60 km. NW Leticia, I-VI-79, 2 females.

The use of guyanensis rather than flavibarbis for this species is explained in the following excerpts from my notes on the specimens in the British Museum made in 1953.

Six females in B.M. There are four specimens labelled as Types, an additional specimen from the Bigot coll. bears a Macquart hand written identification label, and a sixth specimen bears an Austen hand "comp. with Type" label. These specimens represent between them three distinct species of which none of those presently labelled as Types agree with the original description. The two additional specimens not labelled as Types do agree with Macquart's description. Taking the specimens one by one we have the following: Specimen a. Bears a red circled Type label, a hand written Macquart label reading "Tabanus guyanensis n. sp." pasted onto a Bigot label reading "Guyanensis Macq. D. Exot.", a Bigot coll. B.M. accession label, a Kröber det. label reading "Tabanus? aff. innotescens Wlk.", and a note by Philip stating "Not Guyanensis Macq.". Specimen b bears a yellow circled Paratype label, a Bigot coll. B.M. accession label, a det. label in Barnes' hand, a Kröber det. label reading: "Tabanus? Guyanensis" and a red Lectotype label reading "Tabanus Guyanensis" placed upon it by Philip. This specimen appears to have had the head glued on at one time. It is not innotescens Wlk. nor is it guyanensis in my opinion, since the abdomen is entirely clothed with reddish hair and the antennae are reddish brown. Specimen c bears a yellow Paratype label, a Bigot coll. accession label, a det. label in Barnes' handwriting (Barnes was Austen's technician), and a Kröber det. label reading "Tabanus? Guyanensis". This specimen is *innotescens* Wlk., the same as specimen *a*. Specimen *d* bears a yellow Paratype label, Bigot coll. accession label, and a Kröber det. label reading "Tabanus flavibarbis Macq. - Verblichen." This specimen, as noted by Kröber, is faded and dirty, but traces of small pale-haired middorsal triangles remain on the yellowish brown abdomen. It is not *innotescens* nor is it the same as the specimen labelled Lectotype by Philip in my opinion. Specimen *e* bears no Type label, but a Bigot coll. accession label with "Brazil", a Macquart hand written label with "Tabanus guyanensis female J. Macq." pasted onto a Bigot label reading "male coll. Serville Brazil D. Exot." It is a different species from those previously listed and in many ways agrees much better with the original description. Specimen *f* bears a black circled label, a hand written label reading "Tabanus guyanensis Macq. compared with Type", and a Kröber det. label reading "Tabanus guyanensis = flavibarbis Macq." This specimen agrees perfectly with specimen *e*.

I have gone over this puzzling situation with Mr. Oldroyd. He says that the Bigot material arrived at the B.M. without labels except those of Bigot, i.e. the Macquart hand labels pasted onto the Bigot labels. Austen went over some of them and the labels in Barnes' handwriting (specimens *b* and *c*) represent Austen's opinion, as Barnes was his technician at that time. The specimens were double mounted to fit the shallow B.M. drawers after they were received, necessitating the removal and replacement of all labels, and the B.M. accession labels added. Type labels circled in color were added much later by Oldroyd. Oldroyd thinks it likely that the five specimens (*a* to *e*) now bearing Bigot coll. accession labels had between them only the two original Macquart labels now on specimens *a* and *e*. When they were remounted on receipt at the B.M. from Verrall, it is probable that the technician, assuming that all were one species, was not too careful in returning the two labels to the exact specimens on which they were before. The specimen labelled as "comp. with Type" may have been compared by Austen when the Bigot collection was still in Verrall's hands. It certainly would not have been so labelled had one of the presently labelled types been the basis for comparison, since none of these agree. The Bigot specimen (*e*) bearing no type label does agree however, and is also the only one of the Bigot series which agrees at all with the original description. I have placed a note to this effect on specimen *e*, and consider that it should be designated as Lectotype. I believe the label on specimen *a* above really belongs on specimen *e*. My specimen from Pará, as well as others from Eastern Ecuador, agree with this last specimen *e*.

I was unable to locate the type of *T. flavibarbis* Macq. either in the B.M. or in Mus. Paris. It was described from the collection of Marquis Spinola, from Cayenne. Kröber (1934) claims to have seen the type, and makes (1930) *guyanensis* a synonym. What Kröber (1929, 1930) and Bequaert (1926) treat as *flavibarbis* is the same as the specimen I consider the type of *guyanensis*. *Guyanensis* precedes *flavibarbis* on the same page of Macquart's work, and since a type exists, I believe should be accorded priority. The descriptions of the two species do not seem to differ in any important respects, and in the absence of authentic material of *flavibarbis*, I believe it should be considered a synonym of *guyanensis*. *Flavibarbis* was selected as the subgenotype of *Lophotabanus* Szilady by Borgmeier (1933) on the advice of Kröber, but not only is the species not a *Lophotabanus*, it was not included by Szilady (1926) in his original proposal of the subgenus, as pointed out by Bequaert (1940) when he substituted T. bifloccus Szil. (= bifloccus Hine) as subgenotype.

To summarize, I believe that specimens a and c are innotescens Walker, and specimens e and f are guyanensis Macq. Specimen b I do not recognize. Specimen d, although not the same species as guyanensis is close, and may have been confused with it by Macquart. It seems probable that it may have borne the label now on specimen e, which indicates a subsequent det. by Macquart of a specimen from Brasil.

TABANUS HUMBOLDTI n. sp. (Fig. 27, Map 6)

An inconspicuous moderate sized species with blackish thorax, brown abdomen with a row of small faint middorsal dull yellow triangles, bicolored fore tibiae, yellow antennae, narrow frons and glass-clear wings.

Female. Length 16 mm., of wing 13.5 mm. Eyes bare, color or pattern not recorded. Head structures as figured. Frons yellowish gray pollinose, darker and partly bare at vertex, with a black bristled occipital fringe and short brassy hairs on vertex behind. Callus black, dark brown basally. Subcallus, frontoclypeus and genae silvery gray pollinose, whiter than subcallus, both with long sparse white hairs. Beard dense, white. Antennae orange yellow, scape and pedicel with short black setae dorsally, longer whitish ones on sides and below. Third segment with plate orange, style blackish brown. Palpi yellowish white, the basal segment white pilose, the terminal black pilose apically, white basally and ventrally. Proboscis less than head height, dark brown, membranous.

Mesonotum and scutellum with blackish integument, the notopleural and pronotal lobes and sides of scutellum paler, yellowish. Pleura and coxae with more or less blackish integument. Mesonotum gray pollinose, beset with erect black and recumbent brassy hairs, the latter quite dense. Notopleural lobes mainly black pilose, pleura and coxae pale gray pollinose, abundantly white pilose. Fore coxae and femora blackish, the latter black pilose dorsally, long white pilose ventrally. Fore tibiae with basal half dull yellowish, yellow pilose, distal half dusky, black pilose as are tarsi. Mid and hind femora and tibiae reddish yellow, pale haired except for dark hind tibial fringes and all tarsi dark haired. Wings with venation normal, the first posterior cell slightly narrowed, membrane entirely clear including costal cell. Stigma pale yellow. Halteres with yellow stem and ivory knob.

Abdomen yellowish brown in ground color, dorsally black pilose except for small dull yellow median pilose triangles on tergites 1 to 6 and white hairs on extreme lateral margins of tergites 1 to 5. Beneath all sternites except the last are pale pollinose and white pilose.

Holotype female, Brazil, Mato Grosso, Rio Aripuana, Humboldt 59°27'W, 10°10'S, 12-16-VIII-1974, flight trap, D.G. Young coll. To be deposited in Museu Goeldi, Belém.

Paratypes. 8 females, same data as holotype. 1 female Rio Madeira, Abunã, Mann and Baker colls. 2 females, Amazonas, Manaus, Res. Ducke 5, 13-X-81, J. A. Rafael. Paratypes in I.N.P.A, F.S.C.A. and coll. of author.

The paratypes vary from 13 to 17.5 mm. with wing lengths of 10 to 14 mm. Hairs seem easily lost, and abraded specimens appear with plain brown abdomens and dark gray thoraces, since the abdominal triangles are not underlain by pale pollinosity. One paratype has a short appendix on third vein.

This species is quite similar to *T. duckei*, but has yellow antennae, narrower frons, and stouter palpi, among other differences. Its yellow antennae and lack of a pattern of black and white pilosity on venter of abdomen will distinguish it from small specimens of *discus* Wied. Named in honor of Alexander von Humboldt, after whom the type locality was also named.

TABANUS IMPORTUNUS Wiedemann (Map 1)

Tabanus importunus Wiedemann 1828, Auss. Zweifl. Ins. 1:127, female, Brasil. Fairchild 1943, Ann. Ent. Soc. Amer. 35(4):444, Pl. 1, fig. 2; 1967, Pac. Ins. 9(1):99 synonomy; 1971, Cat. Dipt. Amer. S. of U.S. 28:95, synonymy, distrib.

There seems no need to repeat the synonymy, which is detailed in the Catalogue. I have seen the types of all the names there listed. The species, like many common and widespread forms, is quite variable, but can usually be recognized by a combination of gray pollinose mesonotum, smoky areas at ends of basal cells, below stigma, and at fork of third vein, orange brown abdomen with large contiguous dorsolateral orange haired patches on terga 1 to 5, black haired middorsal stripe without pale triangles, and very short stout palpi. The male is very similar in appearance, the eyes bare, holoptic with a well demarcated area of large facets occupying about 1/2 eye area. *Importunus* is a species of open country and disturbed habitats and may be an important pest species. It ranges from Panama south to Paraguay, Bolivia and N. Argentina east of the Andes, but was not taken by Wilkerson (1979) in western Colombia. Badly denuded specimens of this and *T. nebulosus* are sometimes difficult to distinguish. *Importunus* has shorter and more inflated palpi and a dark shade below wing stigma, lacking in *nebulosus*.

TABANUS INDECISUS (Bigot) (Fig. 21, Map 5)

Atylotus indecisus Bigot 1892, Mem. Soc. Zool. France 5:666, female, Amazonia. Fairchild 1956, Smiths. Miscell. Coll., 131(3):20 synonymy.

Tabanus indecisus: Kröber 1934, Rev. Ent. 4(3):310.

Atylotus simplex Bigot 1892, Mem. Soc. Zool. France 5:667, 3 females, Amazonia, Cayenne. Fairchild 1956, Smiths. Miscell. Coll. 131(3):29, lectotype designation; synonymy. Not *Tabanus simplex* Walker 1850.

Only the lectotype in B.M. from the Amazon is this species. I have long series from the vicinity of Belém, Pará, from Humboldt, Rio Aripuana, Mato Grosso, and 1 female each from Porto Velho, Rio Madeira and Peixe Boi, Pará. The species is yellowish brown, the wings lightly and rather evenly faintly brown tinted, the abdomen with prominent yellowish pilose middorsal triangles on tergites 1 to 4, fainter and smaller triangles on 5, and weak, broken pale dorsolateral stripes on tergites 1 to 6, often difficult to see or absent in rubbed specimens. Third antennal segment is black and the frontal callus is round or oval, not an evenly tapered claviform ridge. The abdomen beneath is wholly yellowish pilose, and the prescutellar dark spot is faint and poorly developed.

TABANUS ITAITUBA n. sp. (Fig. 25, A, Map 6)

A large brown species with light brown wings, body and legs entirely clothed with orange yellow pilosity and light brown pollinosity.

Female. Length 20 mm., of wing 16 mm. Eyes bare, the color and pattern in life not recorded. Head structures as figured. Frons dark yellowish brown pollinose, the callus yellow, subcallus with integument orange, gray pollinose. Frontoclypeus and genae the same, beard pale yellowish. Occipital fringe rudimentary, of scattered short dark bristles. Antennae orange, the scape, pedicel and dorsal tooth of basal plate densely dark bristled, the annulate portion of third segment blackish, contrasting with plate. Palpi orange, largely black pilose except ventrally where hairs are longer and yellow. Proboscis less than head height, blackish, wholly membranous.

Mesonotum and scutellum reddish brown, thinly gray pollinose, the pilosity largely of recumbent shiny golden hairs with scattered erect black bristles. Pleura and coxae concolorous. Legs, except blackish tarsi, wholly reddish brown, entirely golden pilose, without hind tibial fringes. Wings with normal venation, no appendix on third vein, wholly pale brownish, the color stronger along the veins. Stigma yellow. Halteres with orange stem, yellowish knob. Abdomen pale orange brown, wholly orange pollinose and dark golden pilose, both above and below.

Holotype female, Brasil, Pará, Jacarecanga, X-1959, M. Alvarenga leg. To be deposited in Museu Paraense Emilio Goeldi, Belém, Pará.

Paratypes, 3 females same data as holotype. 1 female, Transamazonica, Itaituba - Altamira Km 25, Dec. 1971, K.D.W. coll. 1 female, Brasil, Pará, Itaituba, Parque Nacional Amazonia, 17-XI-78, W.L. Overal coll.

The paratypes vary in size from 18 to 22 mm., wing lengths 16.5 to 18.5 mm. and somewhat in color, the Itaituba specimens being darker with dark reddish rather than golden pilosity, perhaps because less faded with time.

The wholly rufous to golden pilosity will easily distinguish this species from all other described regional species except *chalcothrix* Fchld. and *corpulentus* Brèthes. *Chalcothrix* differs by having long slender antennae and a very long appendix at fork of third vein, while *corpulentus* is a larger species with shorter antennal tooth and wings basally brownish, apically hyaline.

TABANUS LUTZI Kröber (Fig. 16, Map 5)

Tabanus macquarti Kröber 1930, Zool. Anz. 90(3-4):83-84. Type female in Vienna (not *T. macquarti* Schiner 1868).

Tabanus (*Lophotabanus*) *lutzi* Kröber 1934, Rev. Ent. 4(3):296 (nom. nov. for *macquarti* Kröb.).

For some reason I overlooked this species when treating the species described by Kröber (Fairchild 1966). I saw the type in Vienna in 1964, which was labelled as follows: old handwritten Venezuela; printed Alte Sammlung with *columbensis* written in; pink type; Kröber det. label 1929 as *Tabanus macquarti*. A compared specimen from Sevilla, Magdalena, Colombia agreed well with the type except for darker legs.

This is an overall yellowish brown species, the integument of thorax reddish brown, scutellum reddish, both with yellowish gray pollinosity and mainly yellowish pilose. There is a small patch of short black pilosity at junction of scutellum and mesonotum, with a small tuft of pale hairs on each side, probably the reason Kröber placed the species in (*Lophotabanus*). The wings are clear, slightly brownish tinged in basal and costal cells, venation normal, no narrowing of first posterior cell nor appendix at fork. The legs are black and black pilose except for pale hairs on posterior aspect of mid and hind femora. Halteres with brown stem and yellow knob. Abdomen reddish brown in ground color, lighter than thorax, pollinose, the first 4 tergites clothed with yellow hair except for a widening broad longitudinal stripe of black pilosity beginning on second tergite and broadening to cover all the tergites beyond the 4th. Beneath, the sternites are yellow pilose at sides and posterior margins, but with the centers of all segments beyond the 1st with increasing black hair until the 7th, which is wholly black haired. Palpi are yellowish, largely black pilose. Structurally this species is much like *T. olivaceiventris*, *T. guyanensis* and *T. nebulosus*, but abundantly distinct on color characters. The male is still unknown.

The species seems to have a restricted distribution in extreme northwestern S. America, as my few specimens have come from Sevilla, Magdalena, Colombia, 21-VII-1927, Geo. Salt coll., 1 female; Venezuela, Apuré, Guasdalito, June 1924, Grisol coll., 3 females; Venezuela, Apuré, Palmarito 15-VIII-1954, I. Ortiz coll., 1 female; Venezuela, Yaracuy, Farrias, 2-VIII-54, I. Ortiz coll., 1 female.

TABANUS NEBULOSUS DeGeer (Map 3)

Tabanus nebulosus DeGeer 1776, Mem. Serv. l'Hist. Ins. 6:227, pl. 30, fig. 2, female, Surinam. Philip 1952, Ann. Ent. Soc. Amer. 45(2): 312, synonymy; 1969, Acta. Zool. Lilloana, 22:128-129. Coscarón 1979, Obra Cent. Mus. LaPlata, 6:266-267, figs. 4F to 4T.

Tabanus ferrifer Walker 1850, Ins. Saunders., Dipt. 1:30, female, Barbadoes. Fairchild 1942, Ann. Ent. Soc. Amer., 35(4):444, fig. 3, synonymy.

Coscarón (1979) has figured both sexes in detail, and given a full list of references while Fairchild (1971) has updated the synonymy, which it seems unnecessary to repeat here. There is a good deal of variation, seemingly correlated with geography. This I recognized in 1971 by accepting *ornativentris* Kröber in a sub-specific sense for the dark heavily marked specimens from the southern part of the species' range. This is the form illustrated by Coscarón (l. c.). Specimens from as far north as Belize and Nicaragua to Surinam and Venezuela are pale brown with large pale orange pilose dorsolateral abdominal spots, pale femora concolorous with tibiae and wings with hardly discernible clouds at fork and crossveins. Specimens from the Amazon basin, Belém and Humboldt, Mato Grosso, are darker overall with femora more or less dusky, but wings even less spotted. Material from Paraguay (5 localities) and Argentina (Santa Fé) has very heavily spotted wings, generally black femora and male eyes with a larger area of enlarged facets, as noted by Philip (l. c. 1969). These differences are as great or greater than those used to separate *T. glaucus* from *nebulosus*, but unfortunately a single female from Dept. Beni, Bolivia, is quite pale, with yellowish femora and wing spots quite weak, though larger than in any northern specimen seen. It also agreed well with a 'cotype' of *ornativentris* in B.M., though much paler than a Paraguayan specimen compared and agreeing with the holotype in Stuttgart. More material from critical areas is needed for a final determination of the status of *ornativentris*.

In the Catalogue (Fairchild 1971) I placed *nubeculipennis* Kröber from Venezuela as a synonym of *nebulosus* after study of its type in Vienna. I now believe that it is more probably a synonym of *glaucus*, since Kröber notes that the frons is narrowed above, a relatively rare condition in *Tabanus*, but found in 6 of the 11 examples of *glaucus* I measured, though not in any specimens of *nebulosus* measured.

It is sometimes difficult to place specimens in this group, as variation is considerable. *Importunus* usually has shorter and more inflated palpi, wings more heavily infuscated, especially below stigma, clear or very pale yellow costal cell, no median pale abdominal triangles, parallel or slightly divergent frons, and reddish scutellum. *Nebulosus* has longer and slightly less inflated palpi, paler wings with seldom any infuscation below stigma, clear or more often pale yellow costal cell, median pale abdominal triangles present in northern specimens, often absent in those from south of the Amazon river, parallel or slightly divergent frons and usually dark reddish scutellum. Femora of both *importunus* and *nebulosus* are usually yellow to orange, but specimens with fore femora dusky to black are not uncommon and some very dark specimens from Belem have all femora quite dusky basally. *Glaucus* has longer and more slender palpi, wings evenly tinted but costal cell dark yellow to orange and often the basal cells more or less infuscated. Median abdominal pale pilose triangles often forming a slender stripe and usually a slender black integumental streak on first 2 tergites. Frons nearly always appearing narrowed above, so that divergence index is rarely over 1.00. Scutellum usually black, rarely reddish. Femora usually entirely blackish, but in a few specimens only basally dusky or wholly orange. *Ornativentris* is structurally like *nebulosus*, but has heavily spotted wings, infuscated femora, and the dorsolateral abdominal pale patches are reduced to small oblique spots.

Frontal measurements of the available specimens give the following maxima, minima and means of the frontal and divergence indices. *T. glaucus*, 11 specimens, 5.8-4.7, mean 5.12 and 1.05-.85. mean .96; *T. nebulosus*, 11 specimens, 5.78-4.77, mean 5.27 and 1.40-1.14, mean 1.25; *T. nebulosus ornativentris* 6 specimens, 5.33-4.62, mean 5.01, and 1.66-1.31, mean 1.41.

TABANUS NEBULOSUS ORNATIVENTRIS Kröber (Map 3)

Hybostraba ornativentris Kröber 1929. Konowia 8:182, pl. 2, figs. 10, 11.
Fairchild 1966, Studia Ent. 9(1-4):363.

In 1966 (l.c.) I discussed the involved synonymy of this name and concluded it was best treated as a southern subspecies of *nebulosus* DeG., as it appears in the catalogue. The frontal indices of available specimens do not differ appreciably from those of *nebulosus*. The accompanying map indicates that the 2 forms are allopatric, though much further collecting will be needed to more clearly define their ranges. See also the discussion under *T. nebulosus*.

TABANUS NEMATOCALLUS n. sp. (Fig. 11, Map 11)

A black species with very narrow frons, brown tinted wings, black antennae, white beard, and usually closed 1st posterior cell.

Female. Length 18 mm., of wing 16.5 mm. Eyes bare, in life greenish black, unpatterned. Head structures as figured. Frons black in ground color, gray pollinose, the upper half thickly beset with short black proclinate setae and a small bare spot at vertex. A postoccipital fringe of stiff black setae mixed with longer lax silver hairs. Subcallus, frontoclypeus and genae silvery white pollinose and with long white hairs. Antennae entirely black, the scape gray pollinose, it and pedicel with black setae dorsally, white ventrally. Palpi with long silvery hairs on first segment and base of second, the terminal half or more of second segment with short black setae. First segment dark gray in ground color, white pollinose. Second segment yellowish white in ground color, whitish pollinose. Proboscis blackish brown, fleshy, the stylets slightly longer than palpi, less than 1/2 head height.

Integument of mesonotum blackish, the notopleural lobes, sutures and extreme sides reddish, dark gray pollinose, clothed with reclinate and erect short black setae and recumbent coppery hairs, the latter forming indistinct dorsolateral stripes covering ends of transverse sutures and sides of scutellum. Prescutellar black spot faint, weakly defined laterally by small paler hair tufts. Pleura black, dark gray pollinose, white pilose except for a tuft of black hairs on mesopleuron. Coxae black, gray pollinose, largely white pilose. Femora black, gray pollinose, dorsally black pilose, ventrally white haired. Tibiae dark brown, wholly black pilose, as are tarsi. Wings strongly brownish, the color filling basal and costal cells, elsewhere in the form of broad margins to all veins. No appendix at fork of third vein, but first posterior cell closed at margin in one wing, barely open in the other. Halteres with orange stem, yellowish white knob. Calypters dusky, the lower lobe with a tuft of silver hairs.

Abdomen with integument nearly black dorsally, bluish black pruinose, black-haired except for very small median white hair tufts on posterior margins of tergites 1 to 6 and larger nearly circular white hair patches dorsolaterally on tergites 2 to 5. Sides of tergites 1 to 4 have contrastingly white integument and white pollinosity and pilosity. Beneath sternite 1 is yellowish in ground color, the remaining sternites dusky with paler margins. Vestiture of sternite 1 is white, the remainder have black hairs in the middle and at the sides, with posterior marginal white pilose bands and a ventro-lateral white stripe the length of abdomen on each side.

Holotype female, Brasil, AM, Manaus, R. Ducke, 20-X-68, R. L. Dressler coll. To be deposited in I.N.P.A.

Paratypes 15 females, Brasil, Amazonas, Manaus, Reserva Ducke, VII-VIII-1981, flight trap, G. B. Fairchild coll., 2 females; Amazonas, Campina Research Sta., 60 Km. N. of Manaus 5-8-VIII-81, G. B. Fairchild coll., 1 female; Manaus, Colonia Sta. Antonio 10-VII-70, T. Pimentel coll., 1 female; Venezuela, Bolivar, Rio Chicarra, 27-IX-66, R. L. Dressler coll., 1 female; Peru, Putumayo, E. Encanto 25-VIII-20, Cornell Univ. Exped., 2 females; Iquitos, III-IV-1931, R. C. Shannon and 24-26-VI-74, J. E. Gillaspy coll., 37 females; Peru, Madre de Dios, Rio Tambopata Res., II-III-1982, Wilkerson coll., 3 females; Colombia, Amazonas, Leticia, II-1972, Ward and Forsyth colls., and 4-VI-79, on horse,

R. C. Wilkerson coll. Paratypes to be deposited in Canadian National Collection; coll. J. Burger; F.S.C.A.; Museu Goeldi, Belem; I.N.P.A., Manaus and the author.

The paratypes range from 16 to 21 mm. The median white spots on the abdomen are often reduced, absent or lost through abrasion, the wing coloring varies somewhat in intensity and the first posterior cell may be closed at margin, short petiolate, or narrowly open. The species can be separated from discifer by having less orange hair on mesonotum, paler wings without a dense and well marked black patch, entirely black antennae, white or gray pilose beard and pleura, entirely white pilose hind margins on all sternites, and closed or nearly closed first posterior cell. T. angustifrons differs principally in having glass clear wings with first posterior cell wide open and slightly less prominent dorsal antennal tooth. T. pellucidus has similar venation, but less heavily brown wings, brown abdomen and legs and usually larger white dorsal spots on abdomen.

I find it difficult to believe that such a seemingly abundant taxon has not heretofore acquired a name, but I have been unable to fit it to any description. The name provided refers to the thread-like frontal callus.

TABANUS OLIVACEIVENTRIS Macquart (Fig. 17, Map 8)

Tabanus olivaceiventris Macquart 1847, Dipt. Exot. Suppl. 2:34(18). Fairchild 1971 Cat. Dipt. Amer. south of U.S. 28:98, synonymy. Wilkerson 1979, Cespedesia 8(31-32):380-382.

The original description is very brief and the type is apparently lost, but the name has long been attached to a species common about Belem, Pará, Brasil and occurring elsewhere in northern South America. Fresh specimens are easily recognized by the combination of pale gray thorax with a black prescutellar spot, generally hyaline wings, and pale olive green abdomen. The eyes are glaucous greenish with a shifting pattern of darker spots. In well preserved specimens faint indications of 3 rows of paler pilose spots forming a median and a pair of dorsolateral stripes on the abdomen are sometimes apparent. The species is quite variable in size and wing color, some specimens having quite smoky wings. The abdominal vestiture may be all black, all yellow or with the stripes indicated above. The legs are entirely pale in ground color. The male is much paler, the abdomen being densely white pilose. The male eyes are not much enlarged, the area of enlarged facets being about 1/2 eye area, fairly well differentiated from the small facets but not very sharply demarcated. Specimens have been seen from Panama, Colombia, Venezuela, Guyane Francaise, Guyana, Suriname, the states of Pará and Amapá Brasil, and Trinidad. It is noteworthy that most records are from near coastal localities.

TABANUS PELLUCIDUS Fabricius (Fig. 10, Map 11)

Tabanus pellucidus Fabricius 1805, Syst. Antl., p. 97, female, Amer. Merid. Wiedemann, 1821, Dipt. Exot. 1:70; 1828, Auss. Zweifl. Ins. 1:129. Kröber, 1934, Rev. Ent. 4(3):313. Fairchild 1966, Psyche 73(1):23-24, type seen.

Tabanus albibarbis Wiedemann 1824, Analect. Ent. p. 21; 1828, Auss. Zweifl. Ins. 1:125-126, female, S. America. Fairchild 1967, Pacific Ins. 9(1):96, type seen.
Tabanus senior Walker 1850, Ins. Saunders. Dipt. 1:67, female, unknown locality.
Chelotabanus albibarbis:Kröber 1932, Rev. Ent. 2(3):297-298, Surinam, Br. Guiana.
Chelommia albibarbis; Philip 1960, Proc. Cal. Acad. Sci. 31(3):98.
Chelommia melanocnemis Barretto 1957, Rev. Brasil. Malar. 8(1):83-84 (1956). Female, Rio Negro, Amazonas, Brasil. ? in part.

This species differs from other members of the group by a combination of the following characters. Dark brown integument of both thorax and abdomen, the scutellum often apically reddish. White beard and white to grayish pleural pilosity; antennae black. Integument of legs including coxae brown. Integument of abdomen reddish brown, the anterior tergites sometimes semitranslucent. Abdomen bluish pruinose, black pilose, with both median and dorsolateral white pilose triangles and circular patches, the first often difficult to see in abraded specimens. Wings moderately brownish infuscated, accentuated along the veins. First posterior cell usually closed and petiolate, at most narrowly open. Beneath the abdomen is largely white pilose, but with a broad median black pilose stripe or row of connected spots. The prescutellar dark pilose spot is quite evident in most specimens.

I have studied, aside from the types of the names listed above, the following specimens. Guyana: Mallali, Br. Guiana, 4-31-07, 2 females, det. Hine as "Tabanus clausus Coq." and "Tabanus olivaceiventris Macq."; same locality, 5-15-07, 1 female, all three in Ohio State University. Venezuela, Estado Sucre, Guariquen 4-10-54, I. Ortiz coll., 1 female; Delta Amacuro, San Francisco de Guayo 27-XII-52, I. Ortiz coll. Suriname, Zanderij Id., 17-22-VI-64, 1 female and 18-21-VII-64, 2 females, D.C. Geijskes coll. Colombia, Meta, Carimagua, Tropical Dry Forest, 20-XI-74, some on cow, 10 females, R. Wilkerson coll. Peru, Madre de Dios, Rio Tambopata Reserve, 30 Km. SW Pto. Maldonado VII, X, XI-1982, 46 females, R. Wilkerson coll.

There is some confusion as to the identity of this species, perhaps due to Fabricius having 2 specimens before him. Wiedemann (1828, p. 129) redescribes the Fabrician specimen he studied as follows (free translation): "Feelers reddish yellow, second segment and tip of third brown. Beard deep yellow, lower face gray, frons yellowish with simple shiny ridge. The mesonotum with anterior part a little pale grayish, the pleura brownish haired. Abdomen dark ocher brown, venter paler. Wings a little smoky gray, the anterior veins brown margined. Legs dark ocher brown, the anterior nearly black." This contrasts with Fabricius' brief description which says (free translation): "Large. Head grayish hairy, antennae black. Thorax blackish, weakly reddish striped. Abdomen subtransparent, reddish, anus darkened. Wings whitish. Legs black." This does not disagree with the specimen I studied from the Copenhagen collection. The other specimen, from the Kiel collection, was so badly preserved that I could see little except that the wing had the first posterior cell open, not closed and petiolate. Such a careful worker as Wiedemann could hardly have drawn his description from the presently labelled Fabrician type. Kröber (1934) did not see specimens, or study the type.

The determination of the proper names for species in this group is most difficult. Either there are 1 or 2 very variable species ranging pretty much throughout the northern half of the continent, as I once believed, or a swarm of closely similar taxa separable on apparently trivial, though consistent, color characters, as now seems to be the case. Their large size and relative abundance in areas accessible to the early collectors resulted in the proposal of numerous names, as can be seen in the listings under *pellucidus* in the Catalogue (Fairchild 1971). My conviction that there was but one variable species arose partly through having very few specimens to compare with the types, and these in many cases in not much better condition than the often very incomplete types, so that I tended to ignore the small differences in my anxiety to have specimens compared and agreeing with the types. With the acquisition of reasonably good series of fresh material, it is evident that quite small differences may be important, and that many of my type comparisons of 1953 (Fairchild 1956) and 1964 (Fairchild 1966, 1967, 1967a, 1967b) are in need of revision. Since I cannot now re-examine all these type specimens, I am forced to make some possibly arbitrary decisions as to the names to be used for the various taxa recognized here. I hope that enough descriptive and illustrative information is included in the present review to enable the various forms to be recognized and my placements corrected by later students. This is especially true in the case of names placed in synonymy, where I have had to depend more on re-evaluation of the original descriptions rather than on what I or others have said or done previously.

Philip (1960) established the synonymy of *senior* with *albibarbis* after study of both types. *Melanocnemis* is placed on the basis of the description. It was described from specimens from upper Rio Negro, Amazonas (holotype) and British Guiana (Paratypes). I studied the latter and concluded they were the same as *crassicornis*, with open first posterior cell. Barretto does not mention the condition of the cell, but his description can apply equally well to *pellucidus* with closed or strongly coarctate cell.

TABANUS PICEIVENTRIS Rondani (Figs. 14, 15, Map 2)

Tabanus piceiventris Rondani 1848, Stud. Ent. Turin 1: 106, female, Brasil. Philip 1965, J. Med. Ent. 2(2):121. Fairchild 1971, Cat. S. A. Dipt., 28:99, synonymy.
Tabanus basivitta Walker 1850, Newman's Zoologist 8:68, female, Pará. Fairchild 1956, Smiths. Miscell Coll. 131(3):12.
Tabanus bitinctus Walker 1857, Trans. Ent. Soc. London, NS 4(5):123, female, Pará.
Tabanus viduus Walker 1850 Newman's Zoologist. 8:68, female, Pará.

I have seen the types of all the above names. The species has not previously been figured. It is a nearly wholly dark brown species showing considerable variation in size and degree of infuscation. The eyes are greenish bronze in life, without stripes, but with a shifting pattern like watered silk. The antennae are dark brown to black, the slender palpi brown, black pilose, the face and cheeks grayish brown, the beard yellowish to nearly black. The mesonotum has blackish integument, thinly dark brown pollinose and with black and yellow brown hairs in a variable mixture. The scutellum may be concolorous or slightly lighter than mesonotum, but there is always an obscure pair of pale pollinose spots anterior to a patch of black pollinosity between mesonotum and scutellum. These spots are usually more evident in denuded specimens, but are not evident in any of the males I have seen. The legs are dark brown, black haired, the femora, especially the fore pair generally slightly darker than tibiae. The fore tibiae are not bicolored, though they may be slightly paler basally. Wings without appendix but the first posterior cell slightly coarctate, more or less infuscated basally and anteriorly, often with anterior veins and fork with accentuated brown margins. In some areas the wings are nearly hyaline, only costal and basal cells showing some infuscation. Abdomen reddish brown to nearly black, brown pollinose, dorsally entirely black pilose, ventrally yellowish to orange pilose, as are the extreme lateral margins of at least tergites 1 to 5. Halteres with brown stem and yellow knob. The smallest specimen seen measured 12.5 mm. with wing of 11 mm., the largest was 20 mm. with wing of 17.5 mm.

Specimens from the vicinity of Manaus are exceptionally dark, with distal half of wings nearly hyaline, while specimens from the region around Belém are browner in body color but with more extensively infuscated wings. Specimens from Surinam, eastern Ecuador, Peru and Bolivia are like those from Belém. An occasional specimen shows a black integumental streak on tergites 1 and 2, like the type of basivitta Walk. I at one time felt that the Manaus population represented a distinct taxa, but except for paler wings, I cannot distinguish them from the presumably typical Pará specimens. A single female from Serra do Navio, Amapá, is like the Manaus material but is the specimen I compared and found to agree with Rondani's type in Naples.

A male from Belém, APEG forest (Mocambo) 29-VII to 6-VIII-1974, D.G. Young coll. has the upper eye facets well differentiated and demarcated from the small facets, in a patch occupying about 1/2 eye area, with a broad occipital band of small facets. There is a small tubercle sunk between the eyes at vertex. It differs from sympatric females only in having more slender antennae, a black beard and dark brown facial pollinosity, and having the abdominal venter entirely dark pilose. Another male from Fordlandia on Tio Tapajós, though old and faded, is like the one from Belém. Should males from Manaus prove conspicuously different, the status of that form will need to be reconsidered and the various type specimens recompared. Distribution of material seen by me is shown on the accompanying map. It was very abundant at the Rio Tambopata Reserve in E. Peru in Feb.-Mar. 1982, 387 females being taken in a flight trap.

T. piceiventris can generally be separated from similar regional species on the structure of head and appendages, dark slender antennae, unmarked dorsally dark pilose abdomen, orange or yellowish pilose beneath, normal venation, and vestiges of a prescutellar spot.

TABANUS PUNCTIPLEURA Hine (Map 4)

Tabanus punctipleura Hine 1920, Ohio J. Sci. 20(8):314-315, female, Costa Rica. Fairchild 1946, Ann. Ent. Soc. Amer. 39(4):569-570, Pl. 1, fig. 4.

Tabanus (Lophotabanus) defilippii:Kröber 1929, Zool. Anz. 83(1-4):126-127, fig. 8. Not T. defilippii Bellardi 1859, misdet.

One of the largest American species of Tabanus, reaching a body length of 23 mm. and wing length of 22 mm. It is an overall dark brown species with brown tinted wings, the costal cell yellowish brown, venation normal. Beard, facial and frontal pollinosity and pleural pilosity yellowish brown with a prominent tuft of black pilosity below wing bases. Antennae black, with a long dorsobasal spine on basal plate. Mesonotum dark brown, gray pollinose, dark pilose, with a prominent black pilose prescutellar spot bordered laterally with small tufts of bright yellowish white hairs. Scutellum concolorous or somewhat reddish. Legs very dark reddish brown, the femora slightly darker, mostly orange pilose but hind tibiae with a prominent posterior fringe of long black hairs. Abdomen black or nearly so, dorsally unmarked, bluish pruinose, the extreme posterolateral corners of tergites 1 to 4 with small pale yellow hair tufts. Venter as dorsum with occasional scattered pale hairs on hind margins of some sternites, but mainly black pilose. The eyes in life are light yellowish green, without bands.

All recorded specimens have come from a small area on the Atlantic or Caribbean coast of Costa Rica and adjoining Panama. The most similar species seems to be T. glaucus, with a similar frons and antennae, though there are numerous differences.

TABANUS SANNIO Fairchild (Map 7)

Tabanus sannio Fairchild 1956 Smiths. Miscell. Colls. 131(3):11-12, nom. nov. pro Tabanus austeni Kröber 1930. Not T. (Ochrops) austeni Szil. 1915.

Tabanus (Phaeotabanus) austeni Kröber 1930 Zool. Anz. 86(11-12):294, figs. 15, 15a, female, Amazonas.

A moderate sized species with wing lengths of 12-13 mm., the thorax with a broad white pollinose stripe its full length, covering all of scutellum. Legs dark brown, wholly black pilose except white pilose fore coxae. Hind tibiae with prominent hind marginal fringe. Abdomen blackish with white pilose median triangles on tergites 2 to 6, much larger on 2 and 4. Tergite 1 all white pilose and 2 to 6 white pilose laterally. Venter white pollinose and sparsely white pilose. Wings hyaline with a complicated pattern of blackish spots which consists of large patches in marginal and first submarginal cells beyond stigma and in apical half of anal cell and much of axillary cell, clouds at all cross veins and fork of third vein, and small spots in center of discal cell and in centers of all cells from 2nd submarginal to 5th posterior.

The type in B.M. is labelled "Amazon 66/53" and a paratype, now headless, is labelled "Amazon Ega 58/6" which may be what Kröber published as "Ago on the Rio" at the end of his description. His figure shows the frons too broad, index 4, while his description gives it as 5.5. His figure of the wing is not inaccurate, though the apical dark spot and that in the anal cell are more diffuse than the other dark spots. My measurements of frons of 3 specimens from Belém, Manaus and Madre de Dios, Peru, give frontal indices of 5.3, 5.2 and 4.9. The specimen from Belém and the 2 from Manaus were taken in traps set in the forest canopy, so the species, like xenorhynchus, is probably arboreal. My Brazilian specimens were taken in Aug. 1981, those from Peru in Nov. 1979, June and Oct. 1982.

TABANUS SUBVIOLACEUS Fairchild (Map 7)

Tabanus subviolaceus Fairchild 1961 Mem. Inst. Osw. Cruz, 59(3):291-293, fig. 5, female, S. Paulo. Brasil.

A blackish species with dark brown costal cells and slender dark brown antennae, but without conspicuous pale markings on thorax or abdomen. Only the types are so far known, the holotype and 1 paratype probably collected by Zikan in 1938, but without locality, the remaining paratype from somewhere in the state of São Paulo. It may prove to be no more than an extremely dark form of basilaris Kröb. when good series become available.

TABANUS UNIMACULA Kröber (Map 7)

Tabanus (Phaeotabanus) unimaculatus Kröber 1930, Zool. Anz. 86(11-12): 280-281, figs. 3, 3a, female, Surinam. Not Macquart 1834.
Tabanus (Phaeotabanus) unimacula Kröber 1934, Rev. Ent. 4(2-3):306 nom. nov. pro T. (Ph.) unimaculatus Kröber 1930.
? Philipotabanus (Mimotabanus) unimacula: Fairchild 1971, Cat. Dipt. S. Amer. 28:80; 1975, Ann. Ent. Soc. Amer. 68(4):689, not seen.

A moderately large species 16-18 mm. in body length, black with a white pilose and pollinose mesonotum and scutellum and a large white trapezoid on tergite 4. Legs entirely black, with long hind marginal fringes on hind tibiae. Wings hyaline with costal cell and most of wing proximal to stigma heavily infuscated. This black area is irregular posteriorly, not reaching hind margin, but with a spur along third vein to fork and paler areas in discal and second basal cells. The head structures are like those of other members of the xenorhynchus group with slender flattened palpi, long proboscis and slender black antennae.

Kröber's description (1930a) is fairly accurate, though his figures are not so good. The types were supposed to be in Halle, but were not received with other Kröber material kindly lent me by Dr. J. Husing previous to 1965. This led to my misplacing the species in 1971 and 1975. Loan of 2 near perfect specimens from Ecuador, Napo prov., Limoncocha, Rio Playaco, 23-VIII-1980, collected in a Malaise trap by Knopf and Dunkle, from my colleague Richard Wilkerson, has permitted proper placement of the species. These specimens agree very well with Kröber's description, though they differ somewhat from his figures. It is possible that examination of Surinam material may cause a revision of the status of these Ecuadorian specimens, though such a wide distribution is not unusual. The wing pattern is very similar to that of T. discifer, but the latter is a larger stouter insect with much narrower frons, small white dorsolateral spots on abdomen, and a prominent dorsal tooth or hook on basal plate of antenna. Subsequently my colleague, I. S. Gorayeb sent another specimen from Peixe Boi, Pará. It is now in Museu Goeldi, Belém.

TABANUS XENORHYNCHUS Fairchild (Map 7)

Tabanus xenorhynchus Fairchild 1947, Ann. Ent. Soc. Amer. (1946) 39(4): 572, pl. 1, figs. a,c. Female, male Panama. 1971, Cat. Dipt. S. Am. 28:104, Guatemala to Panama

A moderate sized species, 15-18 mm., dark brown to black, with a white margined scutellum and mesonotum, small median white spots on tergites 1, 2, 4, 5 and sometimes 6, much larger on 4, and white pilose patches on sides of tergites 1 to 3. Legs wholly black pilose, the hind tibiae with a posterior fringe of long black hairs. Wings smoky infuscated except for a hyaline patch which includes most of discal cell and basal halves of marginal, 1st submarginal and 1st posterior cells between ends of basal cells and fork of third vein. In addition, all cross veins and fork of third vein are surrounded by large round densely infuscated clouds.

The species has been taken frequently at light and in the forest canopy, but rarely at ground level.

TABANUS XUTHOPOGON n. sp. (Fig. 4, Map 12)

A narrow-fronted brown species with black antennae very similar to discus Wied. but with beard and pleural pilosity yellowish brown and with 3 rows of small yellow pilose spots on the abdomen.

Female. Length 18 mm., of wing 16 mm. Eyes bare, without pattern but the color in life not recorded. Frons yellowish brown pollinose beset with short black pilosity on upper half. Callus reddish brown. Vertex darker, subshiny. Occiput gray with long lax sparse pale hairs becoming shorter and darker and forming a fringe of bristles close to upper eye margin. Subcallus concolorous with frons. Frontoclypeus paler, yellowish gray, genae with yellowish gray pollinosity and yellowish brown beard. Antennae as figured, scape and pedicel dark reddish, densely black pilose, third segment velvety black or very dark brown. Palpi yellowish gray pollinose, pilosity largely black, but with brassy hairs basally and ventrally. Proboscis with membranous dull theca and labella, about 1/3 longer than palpi.

Mesonotum with dark reddish brown integument, grayish brown pollinose, the notopleural lobes and lateral margins paler. Pilosity of dark brown erect hairs and shiny orange recumbent hairs, vestiture of notopleural lobes long, blackish, erect, and tufts of longer yellow brown hairs just posterior to wing bases. A small patch of short dense black pilosity on prescutellum but scutellum concolorous with mesonotum. Wings with venation normal, first posterior cell a little narrowed distally. Veins light brown, costal cell yellow, membrane faintly brownish tinted along veins. Pleura yellowish gray pollinose, yellow to brown pilose, including coxae, and with a denser tuft of blackish erect pilosity below wing insertions. Legs black and black pilose except for orange pilosity on bases and posterior aspect of mid and hind femora. Halteres brown with pale yellow knob.

Abdomen with light orange brown integument, the first 2 tergites somewhat bluish pruinose. Dorsal surface black pilose except for small yellow pilose median tufts on terga 1 to 6, and small, round, faint pale pilose dorsolateral spots on terga 2 to 5. Extreme lateral margins of terga 1 to 4 with at least some pale yellow pilosity. Beneath the abdomen is subshiny, largely pale yellow pilose, but with black pilosity forming an indistinct broad median stripe and narrow lateral stripes.

Holotype female, Iquitos, Peru, Mar.-April 1931, R.C. Shannon. The specimen is in near perfect condition, only the tip of one wing worn. To be deposited in F.S.C.A.

Paratypes: Colombia, Amazonas, 9 km. N. Leticia, 3-VI-1979, on horse, R. Wilkerson coll., 1 female; Peru, Rio Samiris, 140 meters, 27-VIII-1952, G.O.P. leg. 1 female; Loreto, Callicebus Research Station, Mishana, Rio Nanay, 25 km. SW Iquitos, 120 m. elev., 10-17-I-1980, Tropical Wet Forest, J. B. Heppner, 3 females; Ecuador, Napo prov., Limoncocha vicinity, 22-7-VIII-1980, netted, Dunkle and Knopf, 2 females; same locality, Playaco river, malaise trap, 23-8-VIII-80, 1 female; Brasil, Pará, Urucurituba, 1 April. C.H.T. Townsend, 1 female; Pará, Rio Gurupi, Canindé, 9-IV-63, B. Malkin, 1 female. To be deposited in U.S.N.M., M.C.Z., Mus. Goeldi and collections of R. Wilkerson and the author. The name is from Greek, signifying a tawny or yellowish brown beard.

The paratypes vary a little, some having extreme bases of tibiae reddish, or lacking pale abdominal spots, which seem easily lost and, not being underlain by pale integument or pollinosity, are often not visible in rubbed specimens. The holotype and the paratype from Urucurituba were compared to Kröber's type of T. cervinus in 1964 and noted to be in fair agreement, but this was before the complexity of the group was appreciated. According to the original description, cervinus has white beard and whitish gray pleural hairs and white dorsal hair tufts on abdomen, thus agreeing with discus rather than the present taxon. Xuthopogon is very similar to discus, differing chiefly in the yellow to brown color of the pilosity and pollinosity of face and pleura, generally more brownish integument of thorax and usually more evident pale pollinose abdominal markings.

CHECK LIST OF SYNONYMS AND HOMONYMS

The following check list contains 53 names believed to be junior synonyms, or homonyms, of species discussed here. Full references to all will be found in Fairchild (1971). They are listed alphabetically here to save space rather than with their respective senior synonyms.

albibarbis Wied. 1824 = crassicornis Wied. 1821
albidicollis Macq. 1850 = importunus Wied. 1828
alboater Walk. 1850 = crassicornis Wied. 1821
albomaculatus Walk. 1854 = discifer Walk. 1850
albopruinosus Kröb. 1930 Not Szil. 1923 = amazonensis Barr. 1949
atricornis Bigot 1892 = crassicornis Wied. 1821
austeni Kröb. 1930 Not Szilady 1915 = sannio Fchld. 1956
basivitta Walk. 1850 = piceiventris Rond. 1848
bicolor Thunb. 1827 Not Wied. 1821 = fuscus Wied. 1819
bitinctus Walk. 1857 = piceiventris Rond. 1848
cervinus Kröb. 1929 = discus Wied. 1828
cinerarius Wied. 1828 = glaucus Wied. 1819
clausus Macq. 1847 = fuscus Wied. 1819
communis Kröb. 1930 = discus Wied. 1828
confligens Walk. 1854 = glaucus Wied. 1819
coriarius Kröb. 1934 nom. nud. = olivaceiventris Macq. 1847
druyvesteijni Szil. 1926 = nebulosus DeG. 1776
erythraeus Bigot 1892 p. 687 Not Big. 1892 p. 661 = fuscus Wied. 1819
ferreus Walk. 1848 = fuscus Wied. 1819

ferrifer Walk. 1850 = nebulosus DeG. 1776
flavibarbis Macq. 1846 = guyanensis Macq. 1846
grandis Kröb. 1931 Not Szil. 1923 = glaucus Wied. 1819
guttigaster Kröb. 1934 = discifer Walk. 1850
guttiventris Kröb. 1929 Not Enderlein 1925 = discifer Walk. 1850
imponens Walk. 1857 = olivaceiventris Macq. 1847
impressus Wied. 1828 = fuscus Wied. 1819
incertus Macq. 1838 = nebulosus DeG. 1776
infuscatipennis Surc. 1919 nom. nud. = discus Wied. 1828
interpunctus Lutz 1918 nom. nud. = ornativentris Kröb. 1929
lividus Walk. 1848 = importunus Wied. 1828
macquarti Kröb. 1930 Not Schiner 1886 = lutzi Kröb. 1934
melanocnemis Barr. 1957 = crassicornis Wied. 1821
monochroma Wied. 1828 = fuscus Wied. 1819
monogramma Wied. 1828 p. 150 = importunus Wied. 1828 p. 127
multimaculatus Lutz 1909 nom. nud. = guyanensis Macq. 1846
neoinnotescens Kröb. 1931 = corpulentus Brèthes 1910
nigropalpis Kröb. 1931 Not nigripalpis Macq. 1846 = subviolaceus Fchld. 1961
nubeculipennis Kröb. 1931 = nebulosus DeG. 1776
piceus Thunb. 1827 = fuscus Wied. 1819
pulverulentus Big. 1892 = olivaceiventris Macq. 1847
punctum Rond. 1848 = olivaceiventris Macq. 1847
robustus Kröb. 1929 Not Taylor 1919 = fortis Fchld. 1961
rubrinotatus Big. 1892 = guyanensis Macq. 1846
rufoniger Walk. 1850 = discus Wied. 1828
semisordidus Walk. 1854 = importunus Wied. 1828
senior Walk. 1850 = pellucidus Fab. 1805
simplex Big. 1892 Not Walk. 1850 = indecisus Big. 1892
surinamensis Macq. 1838 = nebulosus DeG. 1776
tenens Walk. 1850 = glaucus Wied. 1819
transversalifuscatus Kröb. nom. nud. = nebulosus DeG. 1776
valterii Macq. 1838 = importunus Wied. 1828
viduus Walk. 1850 = piceiventris Rond. 1848
viridescens Kröb. 1931 = olivaceiventris Macq. 1847

CHECK LIST OF EXCLUDED NAMES, WITH REASONS

amapaensis Fairchild. Long appendix at fork.
antarcticus Linnaeus. Long appendix. Scutellar spot present.
bigoti Bellardi 1859. Not east of Andes.
brevifrons Kröber 1931. Still unrecognized. 14 mm. Said to be like piceiventris Rond. but smaller. Rio de Janeiro.
brevitrianguliferus Kröber 1931. Still unrecognized. 14 mm. Male from Venezuela, destroyed; female loc. unknown, lost.
campestris Brèthes 1910. Not north of Argentina. Lineola group.
chalcothrix Fairchild 1961. Long appendix.
fumomarginatus Hine 1920. Scutellar spot present.
fuscofasciatus Macquart 1838. Mostly Paraguay, Uruguay and Argentina. An as yet unresolved species complex of brown species with mid-dorsal black abdominal integumental stripe.
hirtitibia Walker 1850. Mainly Andean, related to bigoti.
lineifrons Lutz 1912. Long appendix.

macquarti Schiner 1868. Mainly Central American, Bigoti group.
melanogaster Brèthes 1910. Argentina; too small; fuscofasciatus group.
miles Wiedemann 1828. Long appendix; rather small.
mucronatus Fairchild 1961. Too small. Abdomen pointed.
neglectus Kröber 1931. Still unrecognized, 11-13 mm. Too small.
neovestitus Kröber 1931. 15 mm., long appendix, unknown locality.
nigrofemoratus Kröber 1929. Male. Bolivia, probably in fuscofasciatus complex.
pachypalpus Bigot. Ecuador; bigoti group.
perplexus Walker 1850. Andean; bigoti group.
peruvianus Macquart 1848. Andean; bigoti group.
prunicolor Lutz 1912. A Stypommisa.
pseudoculus Fairchild 1942. Long appendix; scutellar spot.
rubidus Macquart 1847, not Wiedemann 1821. Still unrecognized. Guyane Fr. Type headless.
rubripes Macquart 1838. Long appendix; scutellar spot.
sorbillans Wiedemann 1828. Long appendix.
strigimaculus Fairchild 1942. Long sppendix.
surifer Fairchild 1964. Andean and Central America; bigoti group.
tenuistria Kröber 1931. Espirito Santo. 16 mm. Type lost. Still unrecognized.
thiemeana Enderlein 1925. Andean; bigoti group.
unipunctatus Bigot 1892. Scutellar spot. Small.
vestitus Wiedemann 1819. Long appendix.
weyrauchi Barretto 1949. Andean; bigoti group.

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FIGURES

AND

MAPS

EXPLANATION OF FIGURES

All figures are to the same scale, shown beside fig. 1, and were drawn with the aid of a built-in camera lucida on a Wild binocular microscope. All are of female frons, antenna and palpus unless otherwise indicated.

Figs. 1 - 15.

Fig. 1. *T. amazonensis* Barr., Brasil, Amazonas, Manaus, Reserva Ducke, 30-VI-1970, T. Pimental coll.

Fig. 2. *T. angustifrons* Macq. Brasil, Amazonas, Rio Branco, Sororoca, 1-IX-24, J. Bequaert coll., homotype, det. as *alboater* Wlk. by J. Bequaert.

Fig. 3. *T. discifer* Walk., Brasil, Pará, Ilha do Marajó, compared and agreeing with types of *discifer* Walk. and *albomaculatus* Walk.

Fig. 4. *T. xuthopogon* n. sp. holotype, Peru, Iquitos, Mar.-April 1931, R. C. Shannon coll.

Fig. 5. *T. xuthopogon* n. sp. paratype, Brasil, Pará, Urucurituba, 1 April, C.H.T. Townsend coll., compared and in fair agreement with type of *T. cervinus* Kröb.

Fig. 6. *T. discus* Wied. Br. Guiana, Mazaruni river, Forest Settlement, 29 Aug. 1935, N.A. Weber coll. No. 338. Compared and agreeing with type of *discus* in Berlin.

Fig. 7. *T. crassicornis* Wied., Suriname, Republiek, 29 Sept. 1963. D.C. Geijskes coll., compared and agreeing, though smaller, with type of *crassicornis* in Copenhagen.

Fig. 8. *T. crassicornis* Wied., Brasil, Amapá, Serra do Navio, 29-IV-1957, J. Lane leg., compared and agreeing with paratype of *T. melanocnemis* Barr. in London.

Fig. 9. *T. fuscus* Wied. Brasil, S. Paulo, Rib. Prêto, 28-X-54. Barretto coll., in close agreement with type of *fuscus* in Vienna.

Fig. 9a. Male palpus of *T. fuscus*, Brasil, Sta. Catarina, Nova Teutonia 28-I-1960, Plaumann coll.

Fig. 9b. Male palpus of variant *fuscus*, Brasil, São Paulo, Butantan, 22-I-1918, A. Esteves coll.

Fig. 10. *T. pellucidus* Fab., Venezuela, Delta Amacuro, S. Francisco de Guayo, 27-XII-52, I. Ortiz coll., compared and agreeing with types of *pellucidus* Fab., Copenhagen, *albibarbis* Wied., Copenhagen, and *senior* Walk., London.

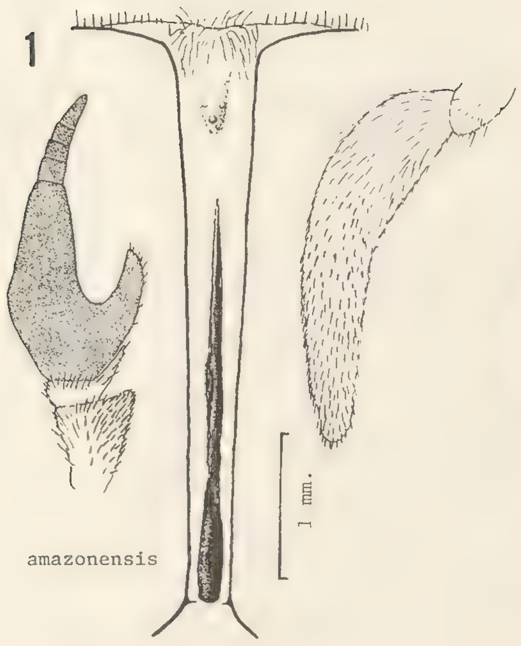
Fig. 11. *T. nematocallus* n. sp., holotype, Brasil, Manaus, Res. Ducke, 20-X-68, R. L. Dressler coll.

Fig. 12. *T. sannio* Fchld., Brasil, AM., Manaus, Parque Laranjeiras, 29-VII-81, arboreal flight trap, Fairchild coll.

Fig. 13. *T. basilaris* Kröber, Brasil, Minas Gerais, Lassance, 20-31-I-39, Martins, Lopes e Mangabeira colls., compared and agreeing with type of *basilaris* in Vienna.

Fig. 14. *T. piceiventris* Rond., Brasil, Amazonas, Manaus, campus Universit. 26-VIII-78, Malaise trap, J. A. Rafael coll.

Fig. 15. *T. piceiventris* Rond., Brasil, Pará, Belém, APEG forest, 29-VII to 6-VIII-74, flight trap, D.G. Young coll., the abnormal antenna from another specimen same data.

1


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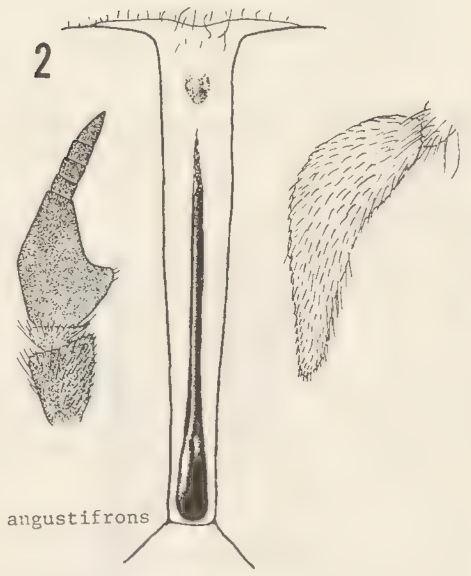
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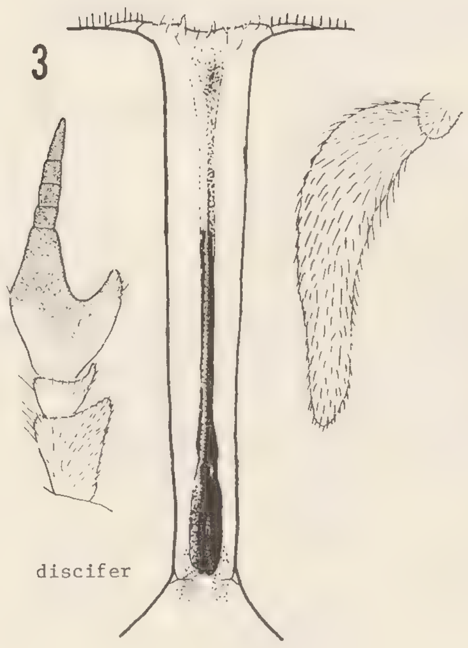
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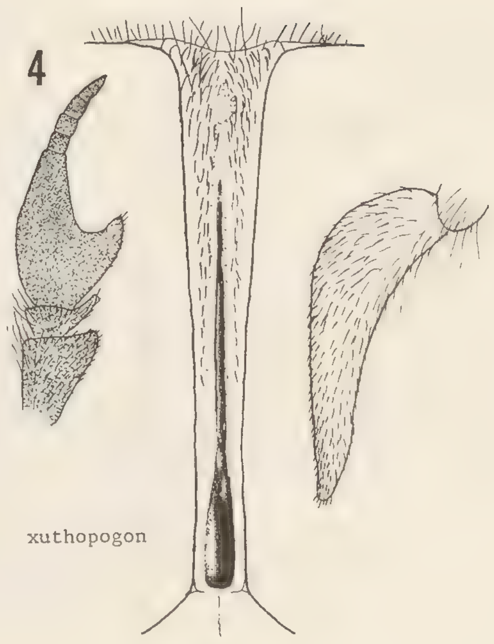
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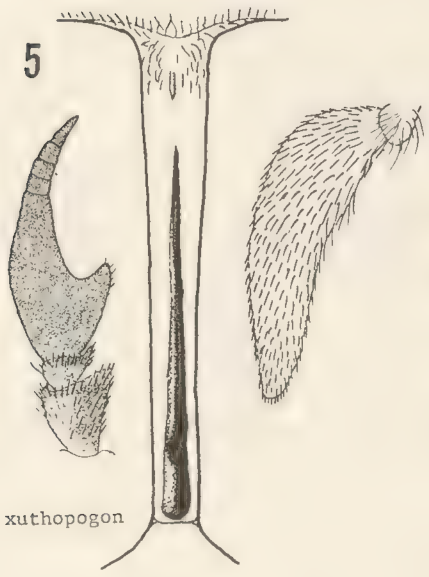
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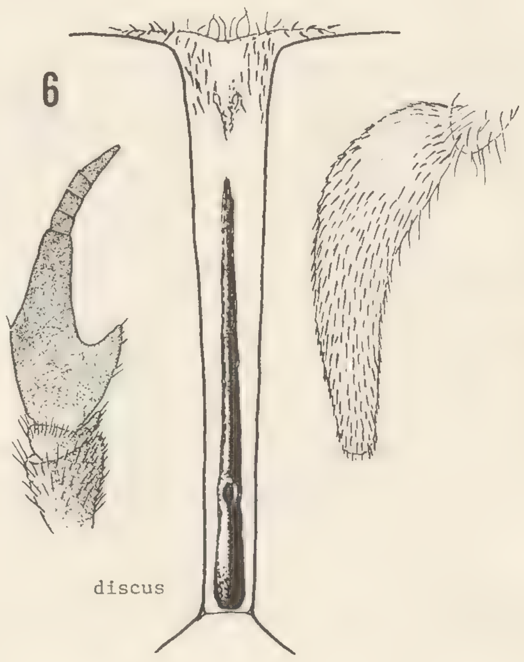
discus

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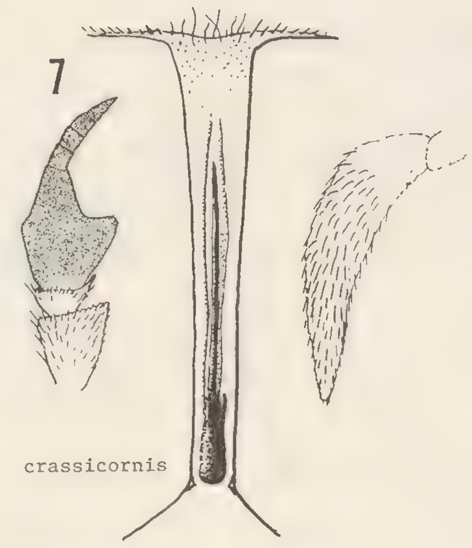
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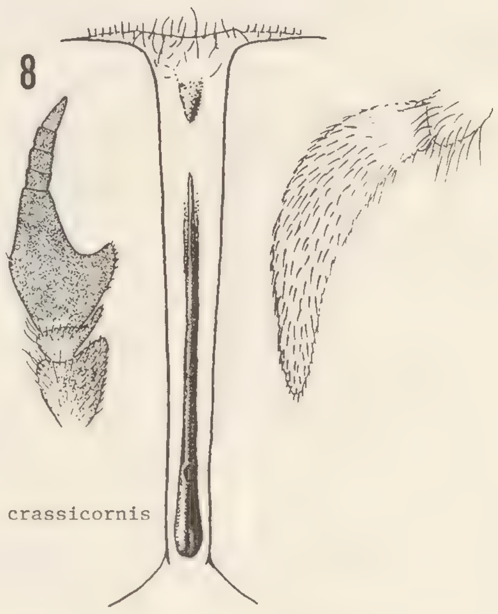
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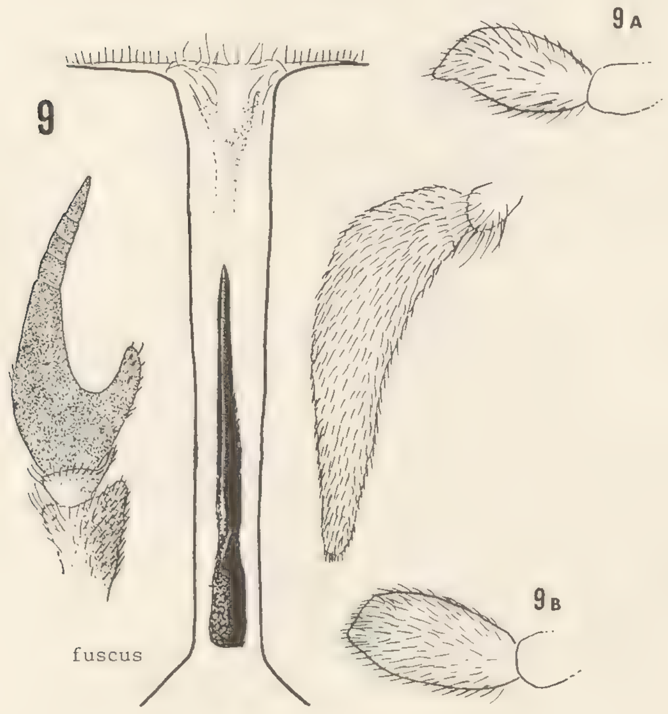

fuscus

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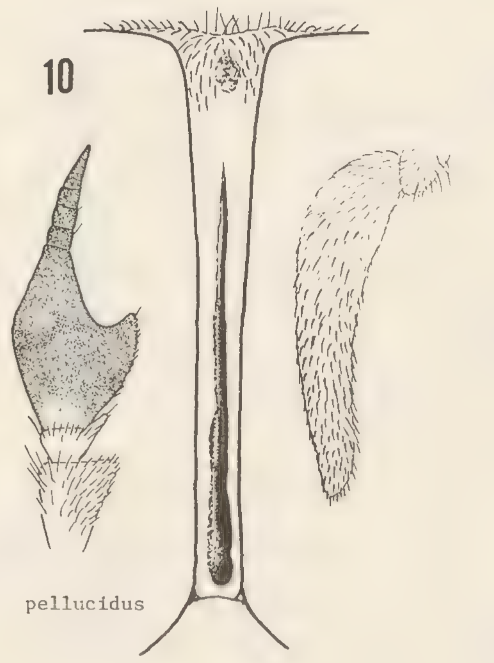
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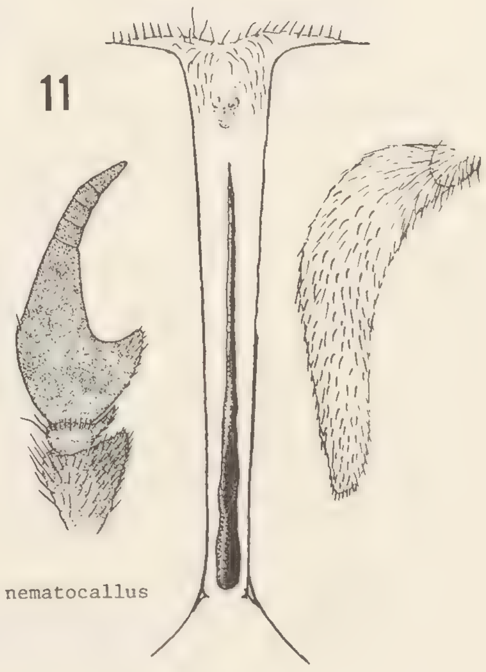
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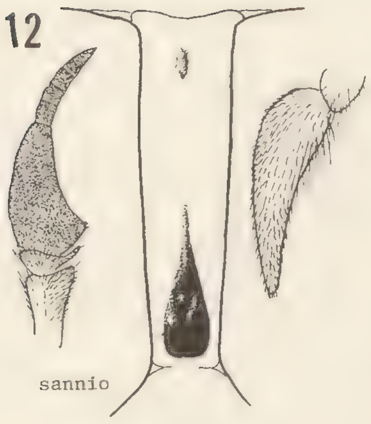
sannio

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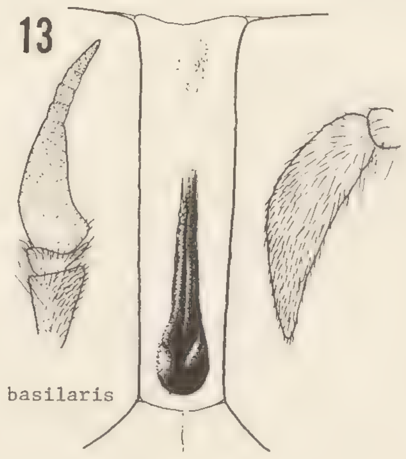
basilaris

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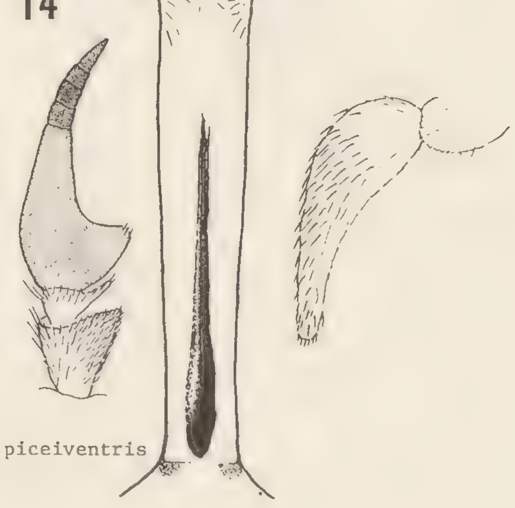
piceiventris

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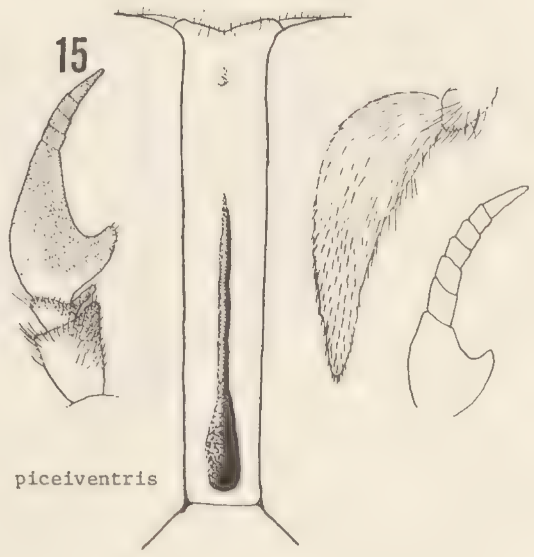

piceiventris

Figs. 16 - 29. See preceeding page for explanation

Fig. 16. *T. lutzi* Kröber, Venezuela, Apuré, Guardualito, June 1924, M. Grisol leg.

Fig. 17. *T. olivaceiventris* Macq. Brasil, Pará, Belém, 2-IX-43, R. M. Gilmore coll., compared and agreeing with types of *imponens* Walk. and *pulverulentus* Bigot in London.

Fig. 18. *T. guyanensis* Macq., Brasil, Pará, Aurá, no date.

Fig. 19. *T. comosus* Stone, Venezuela, Rio Orinoco, lst camp below Barancas village, 3-II-35, N.A. Weber coll.

Fig. 20. *T. glaucus* Wied., Brasil, Mato Grosso, Maracaju, Apr.-May 1937, Shannon and Fairchild colls., compared and agreeing with lectotype of *glaucus* in Vienna.

Fig. 21. *T. indecisus* Bigot, Brasil, Pará, Belém, VII-1931, R. C. Shannon coll., compared and agreeing with type of *indecisus* in London.

Fig. 22. *T. antunesi* n. sp., Brasil, Bahia, Ilhéus, Aug. 1934, P.C.A. Antunes coll., paratype.

Fig. 23. *T. duckei* n. sp., Colombia, Serra de Cupaty, Rio Japurá, (Caqueta), perto da fronteira do Brasil, XI-1912, A. Ducke coll., paratype.

Fig. 24. *T. casteetus* n. n., Brasil, Amazonas, Rio Vaupes, Taracuá, 3/2 1924, Melin coll., compared and in fair agreement with type of *testaceus* Macq. in Paris.

Fig. 25. *T. itaituba* n. sp., Brasil, Pará, Jacareacanga, X-1959, M. Alvarenga leg., holotype.

Fig. 25a. *T. itaituba* n. sp. antenna only, Brasil, Pará, Transamazonica, Itaituba - Altamira Km. 25, Dec. 1971, K.D.W. coll., paratype.

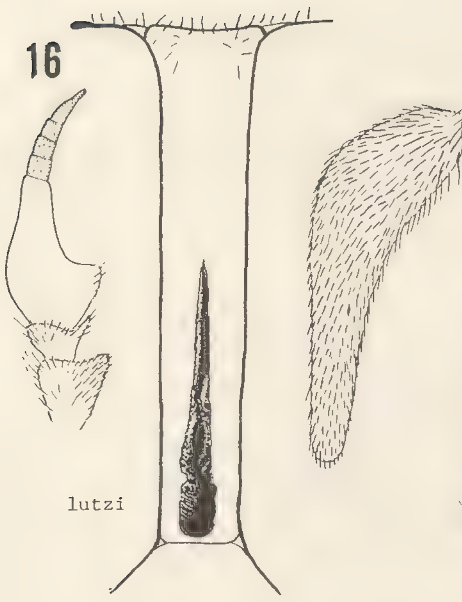
Fig. 26. *T. corpulentus* Brèthes, Paraguay, Villarica, F. Schade coll., no date, compared and agreeing with type of *neoinnotescens* Kröb. in Munich, the male palpus Brasil, São Paulo, S. José dos Campos, XII-1954, H.S. Lopes coll.

Fig. 27. *T. humboldti* n. sp., Brasil, Mato Grosso, Rio Aripuana, Humboldt, 59°27'W, 10°10' S, 12-16-VIII-74, flight trap, D.G. Young coll., holotype.

Fig. 28. *T. fortis* Fchld., British Guiana, Bartica, 14-VI-1901, compared and agreeing with type of *robustus* Kröb. in Vienna.

Fig. 29. *T. aaptus* n. sp., Brasil, Amazonas, Manaus, Reserva Ducke, 17-VII-81 flight trap, Fairchild, Rafael and Gorayeb colls., holotype.

16



lutzi

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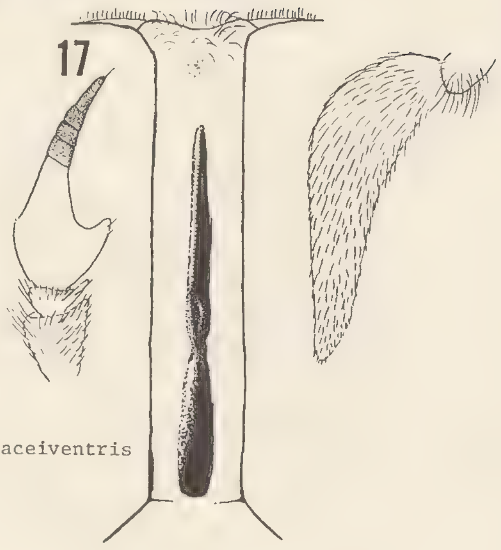

olivaceiventris

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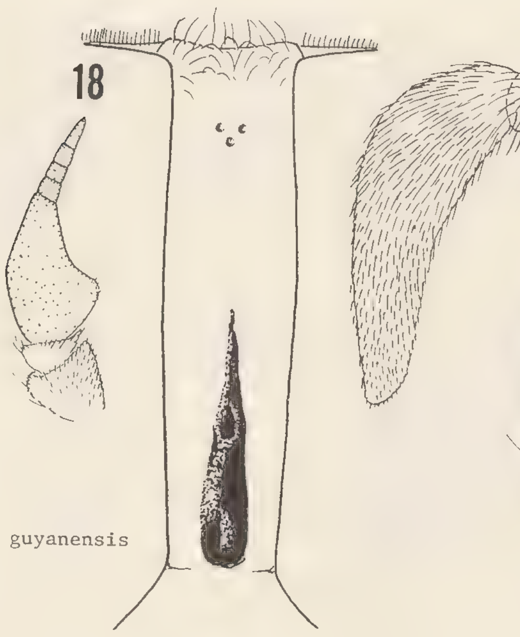

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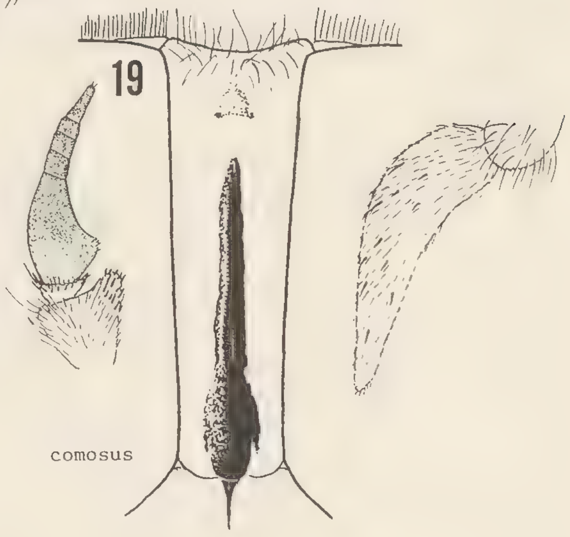

comosus

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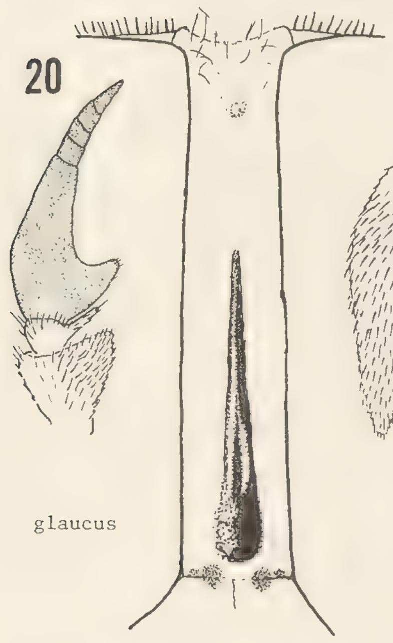

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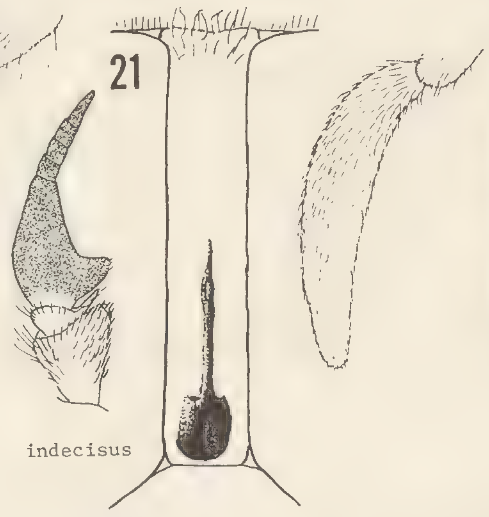

indecisus

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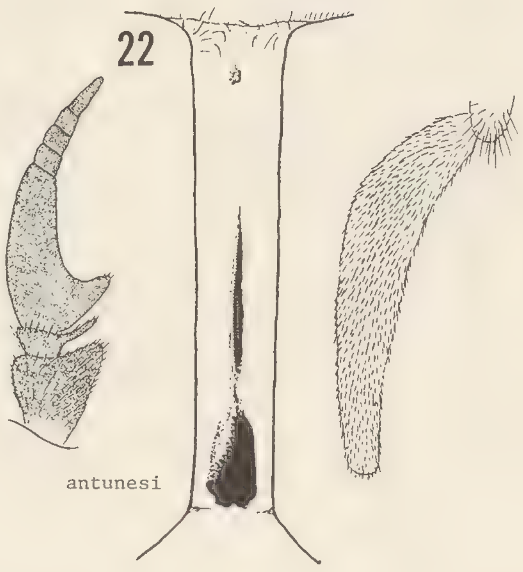

antunesi

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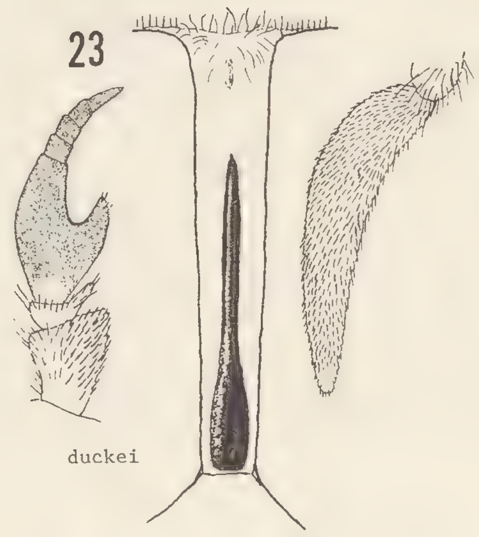

duckei

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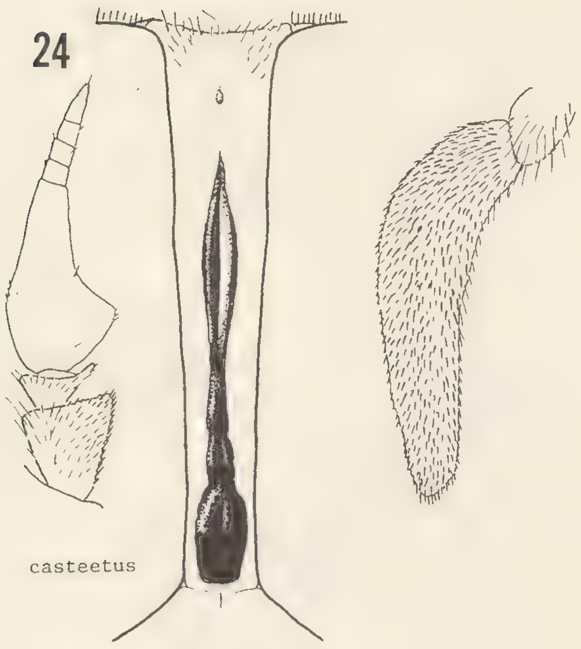

casteetus

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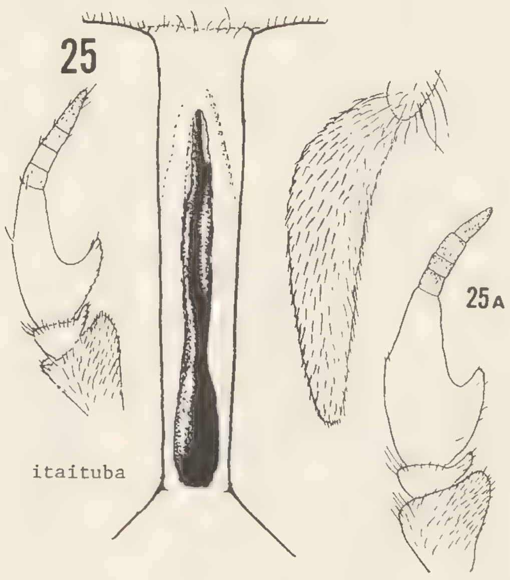

itaituba

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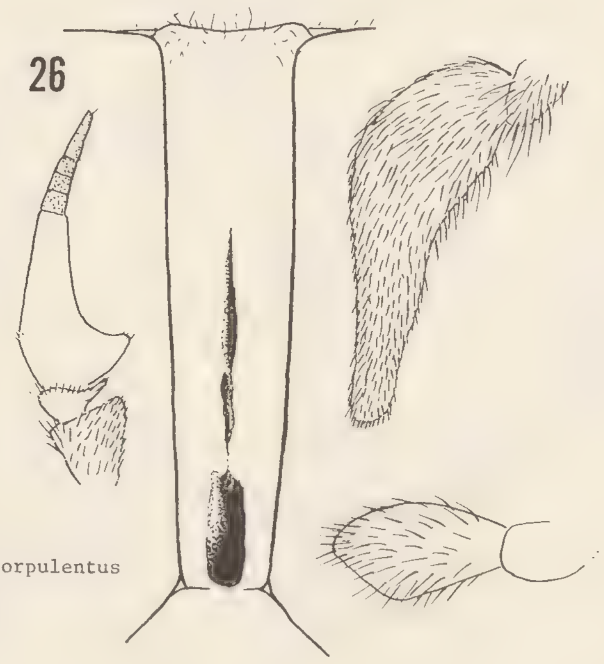
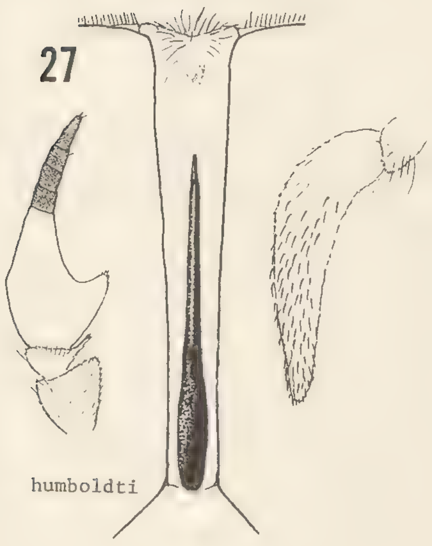


corpulentus

27



humboldti

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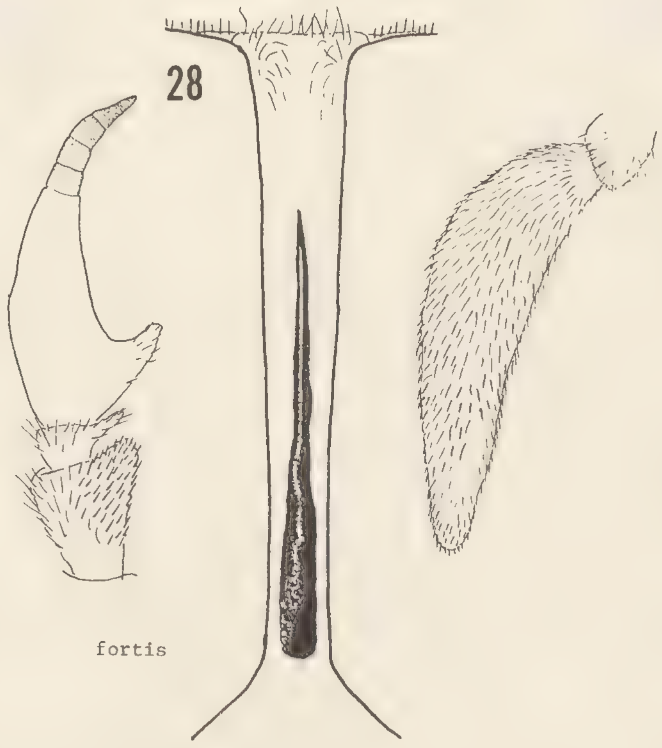

fortis

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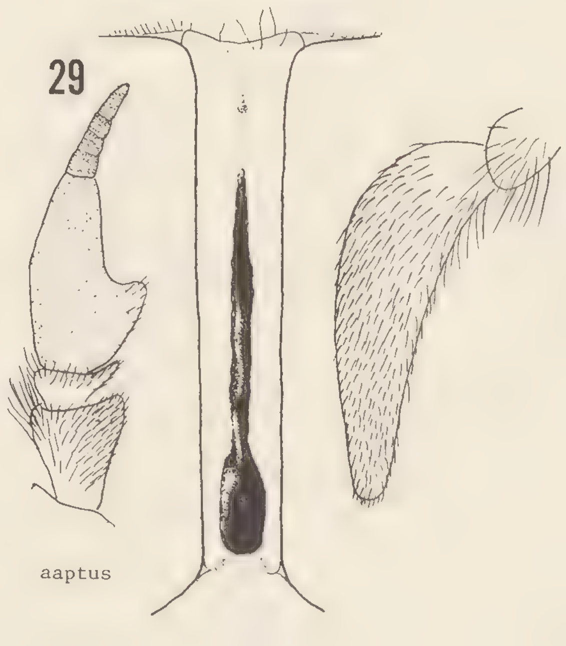
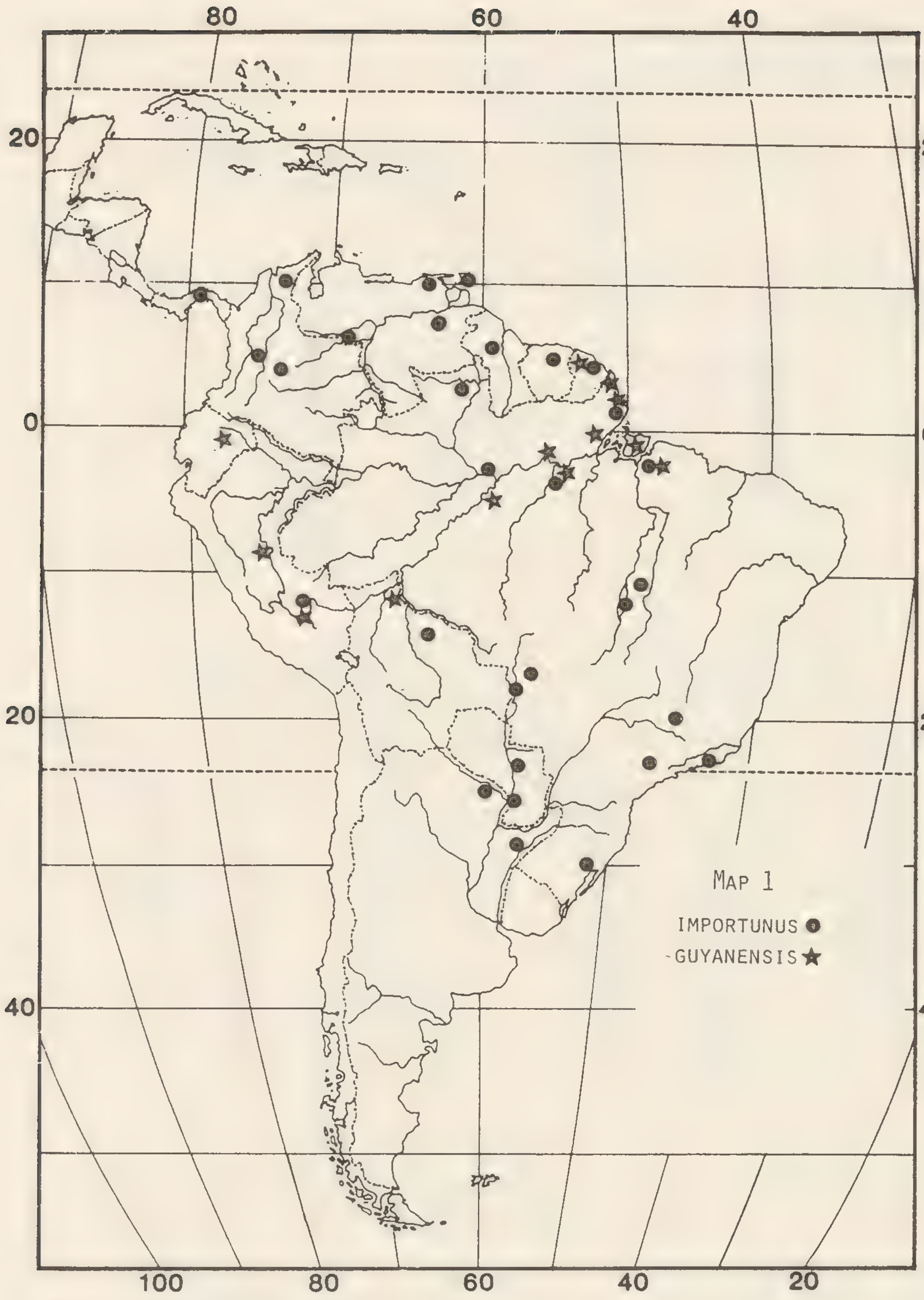
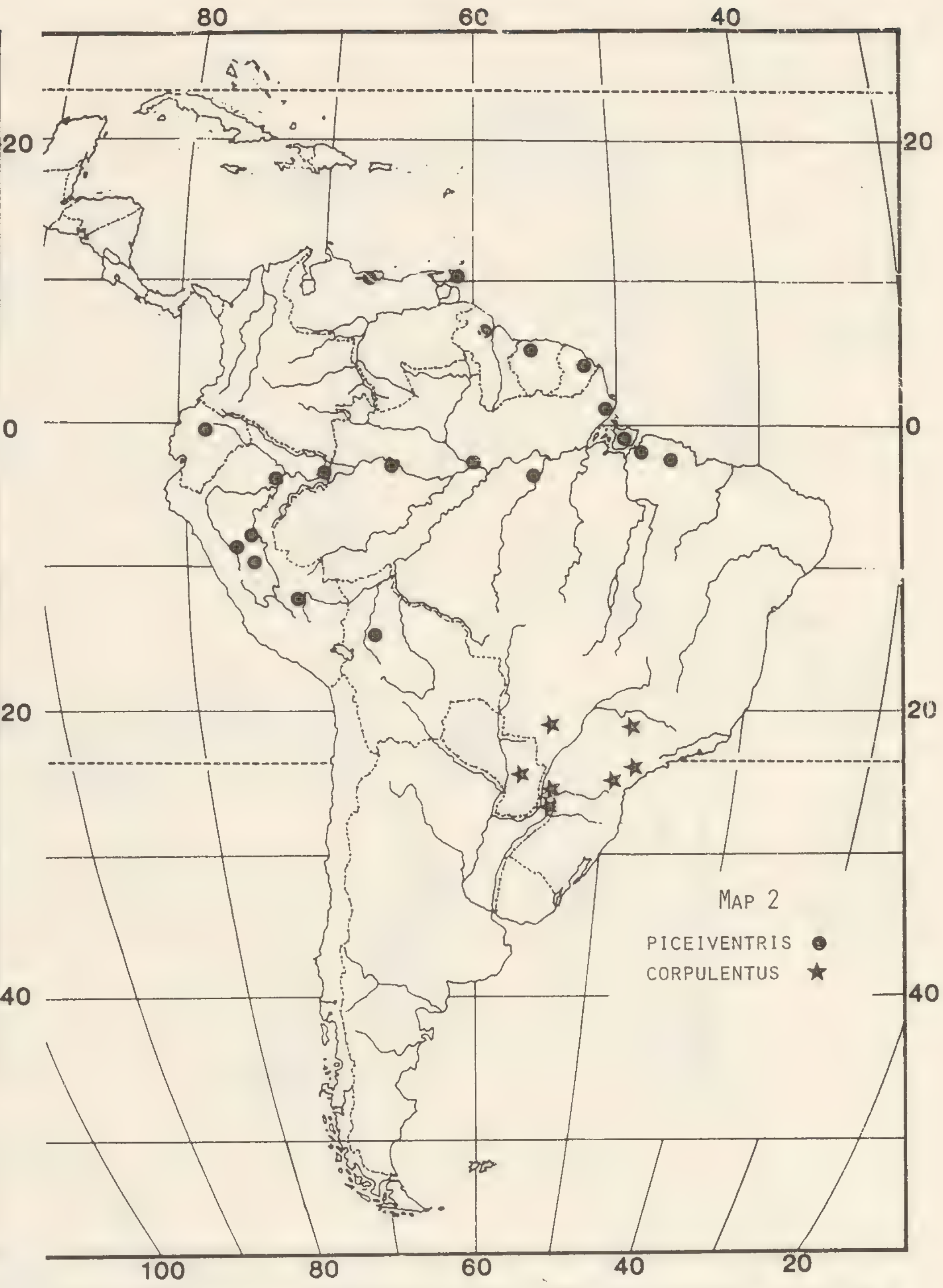
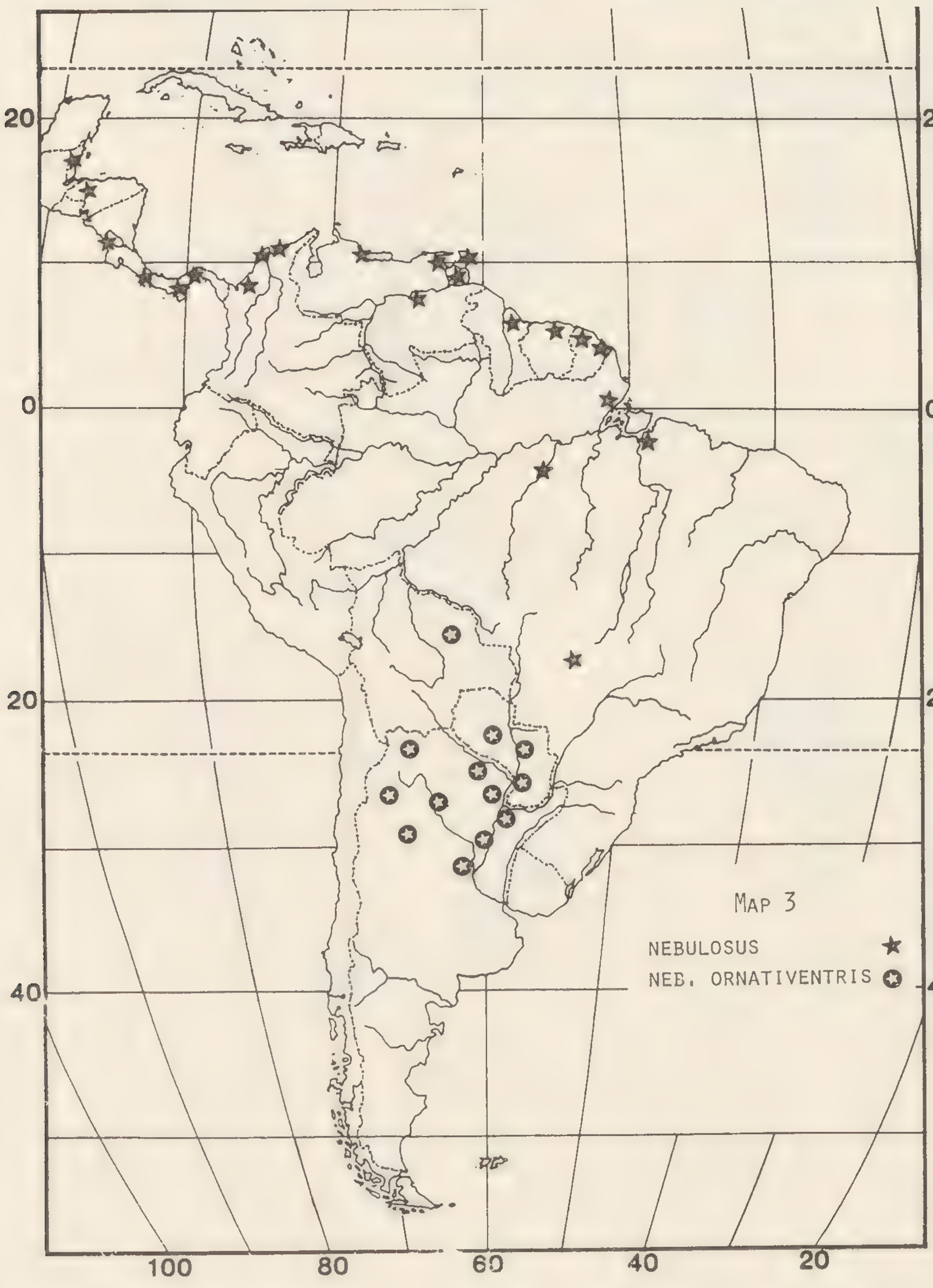
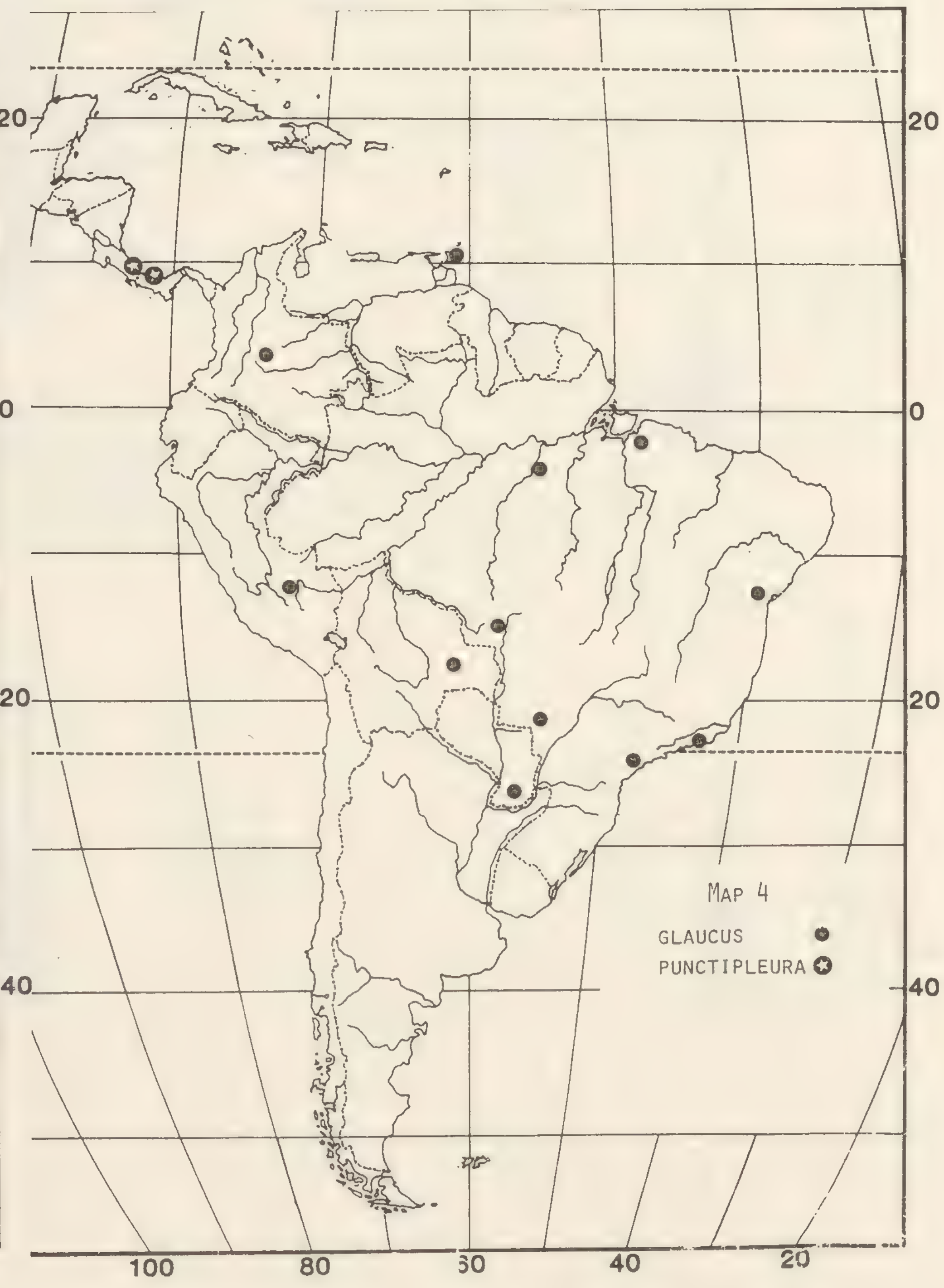


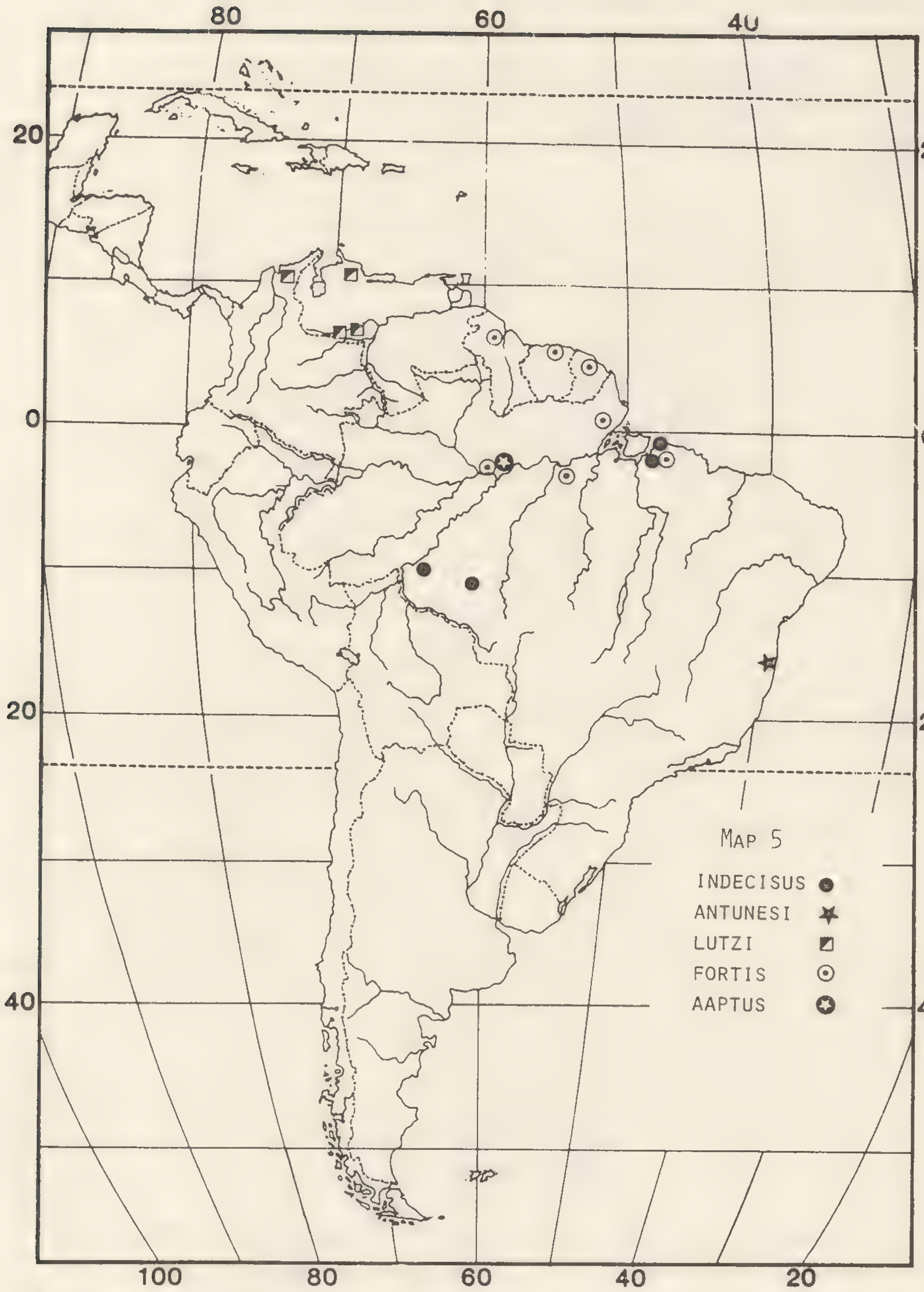
aaptus


Map 1
IMPORTUNUS ●
GUYANENSIS ★


Map 2
PICEIVENTRIS ●
CORPULENTUS ★


Map 3
NEBULOSUS ★
NEB. ORNATIVENTRIS ✪


Map 4
GLAUCUS ●
PUNCTIPLEURA ✪


80
60
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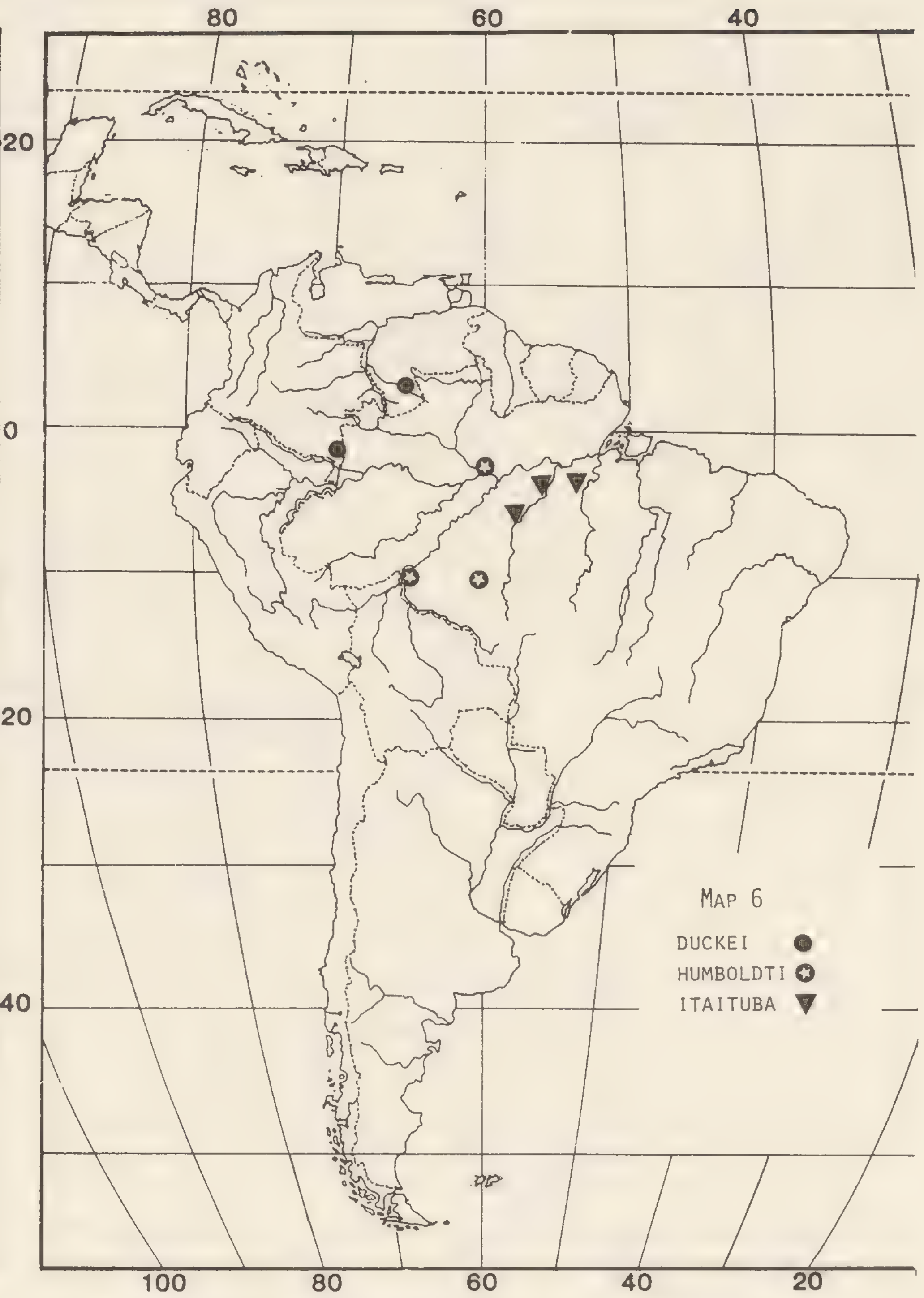
40
Map 5
INDECISUS ●
ANTUNESI ✶
LUTZI ◪
FORTIS ⊙
AAPTUS ✪
100
80
60
40
20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HUMBOLDTI ✪
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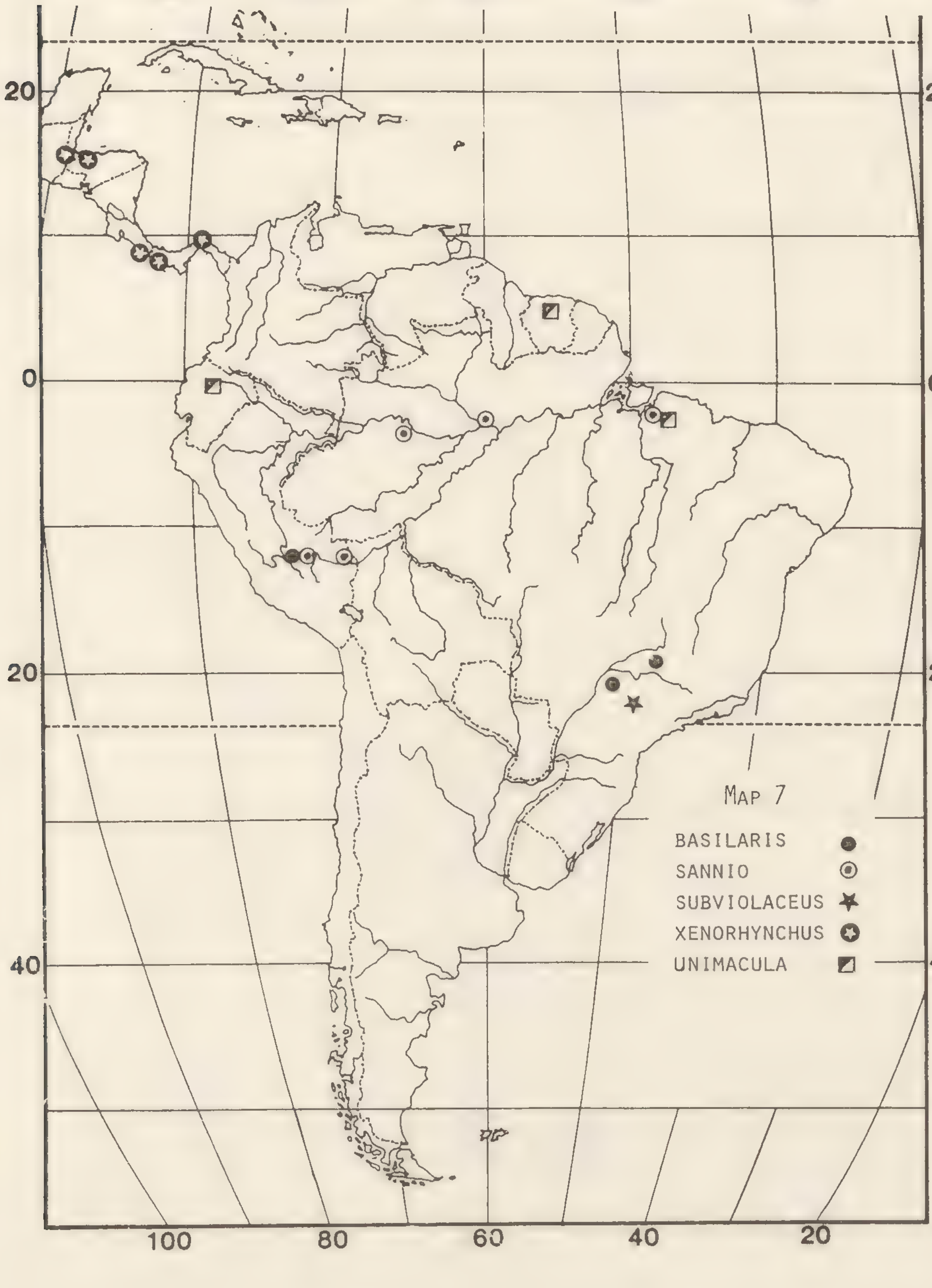
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SANNIO ⊙
SUBVIOLACEUS ✶
XENORHYNCHUS ✪
UNIMACULA ◪
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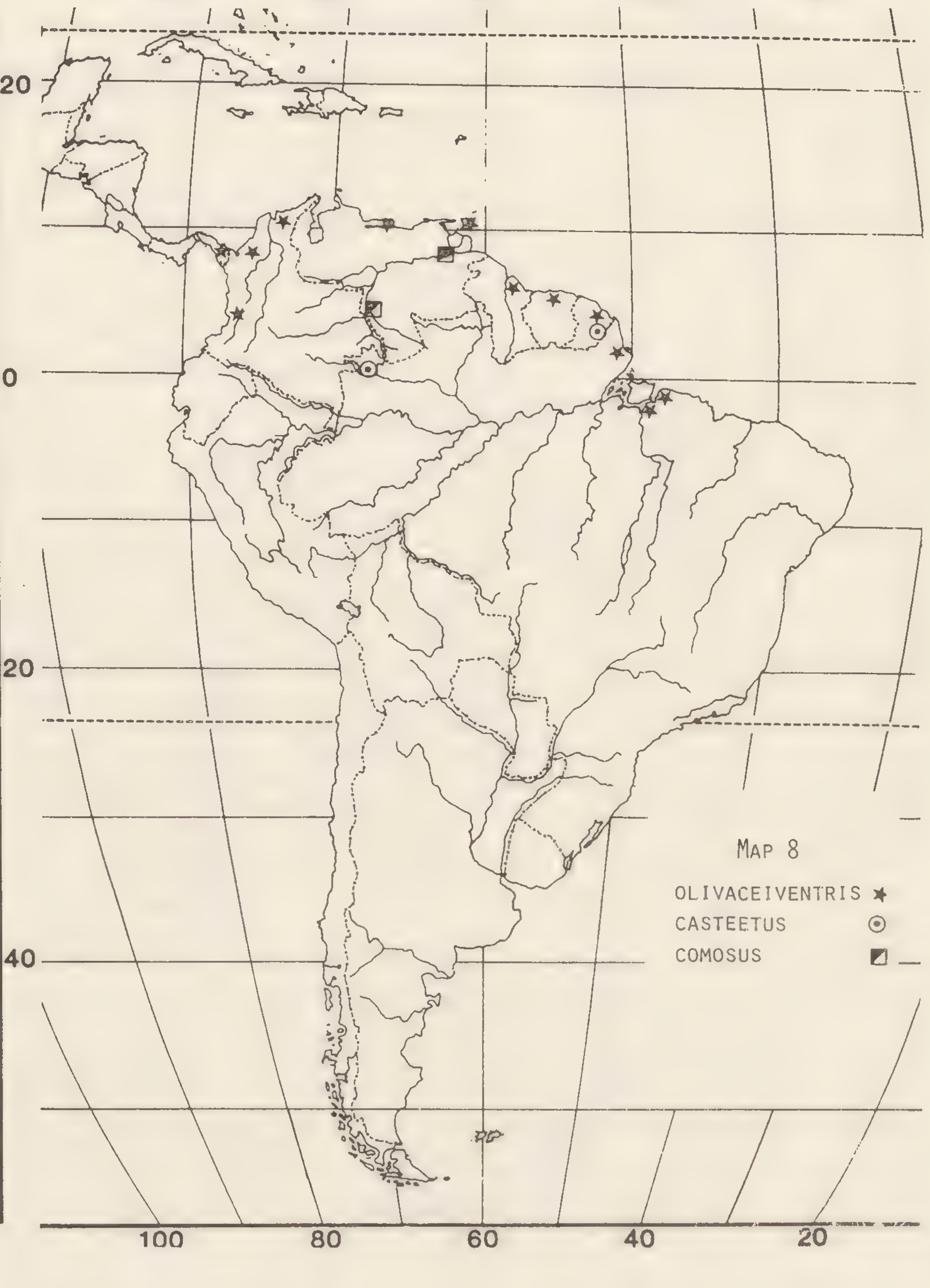
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CASTEETUS ⊙
COMOSUS ◪
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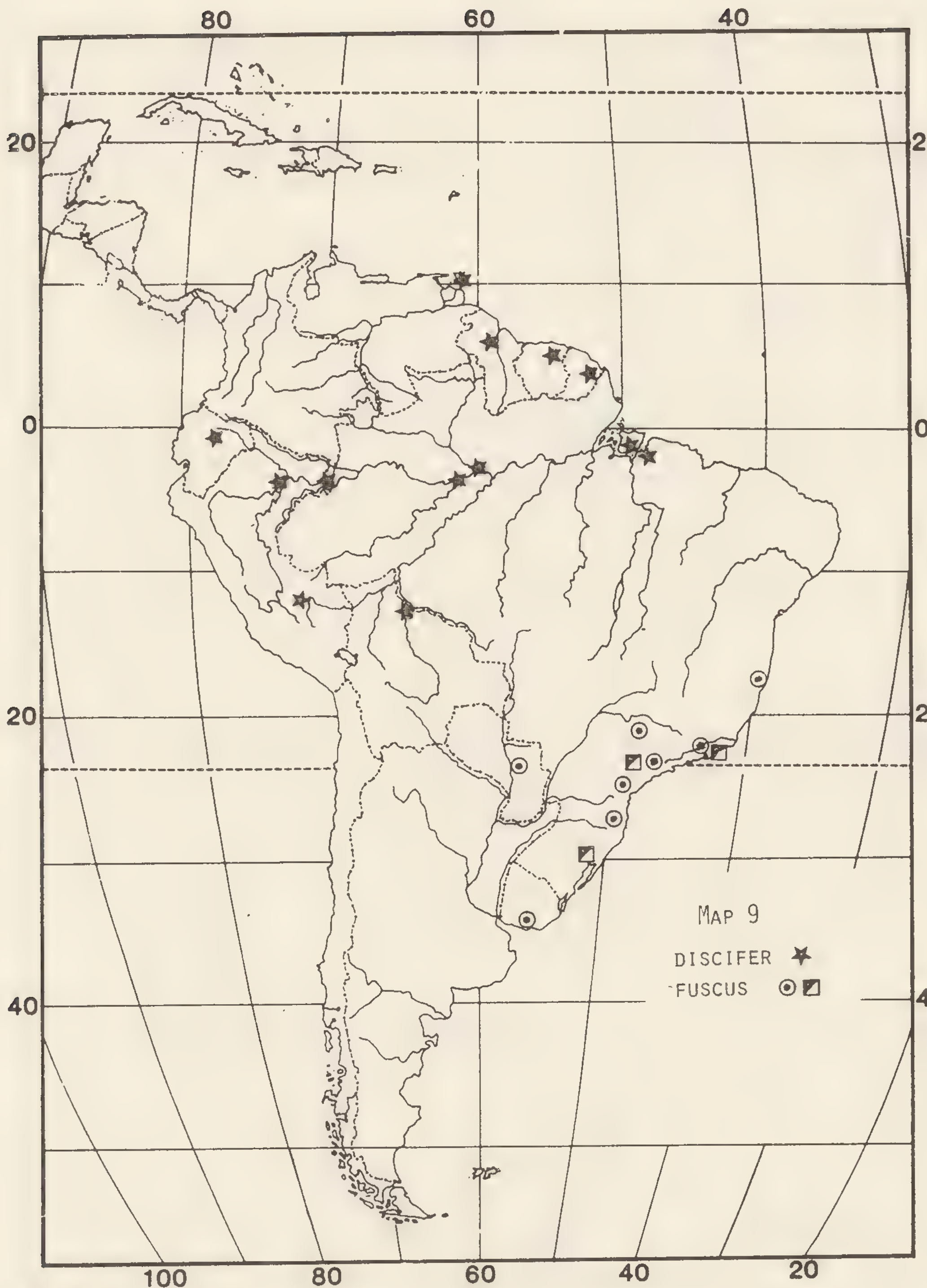
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DISCIFER ★
FUSCUS ⊙ ◩
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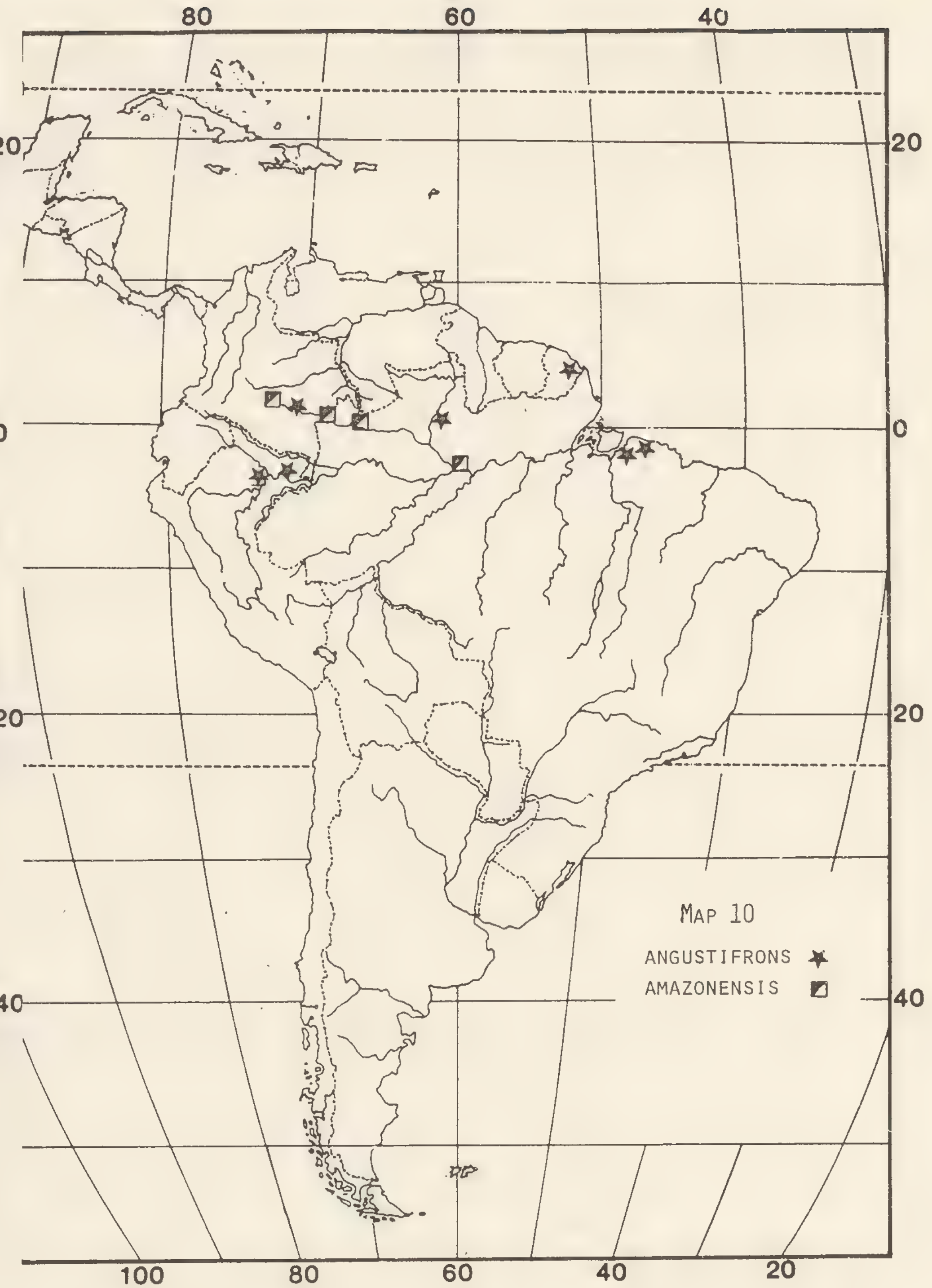
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AMAZONENSIS ◩
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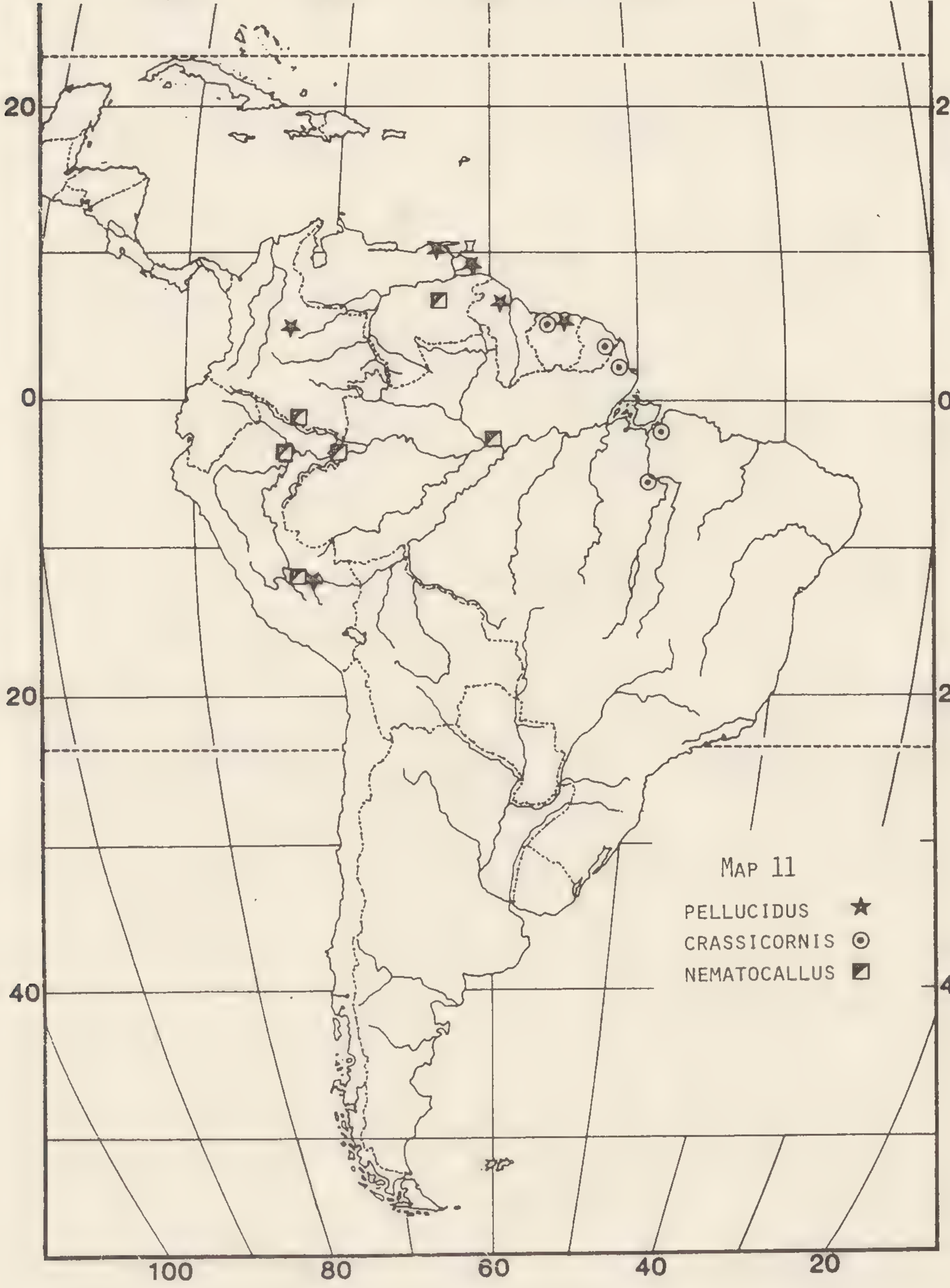
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NEMATOCALLUS ◩
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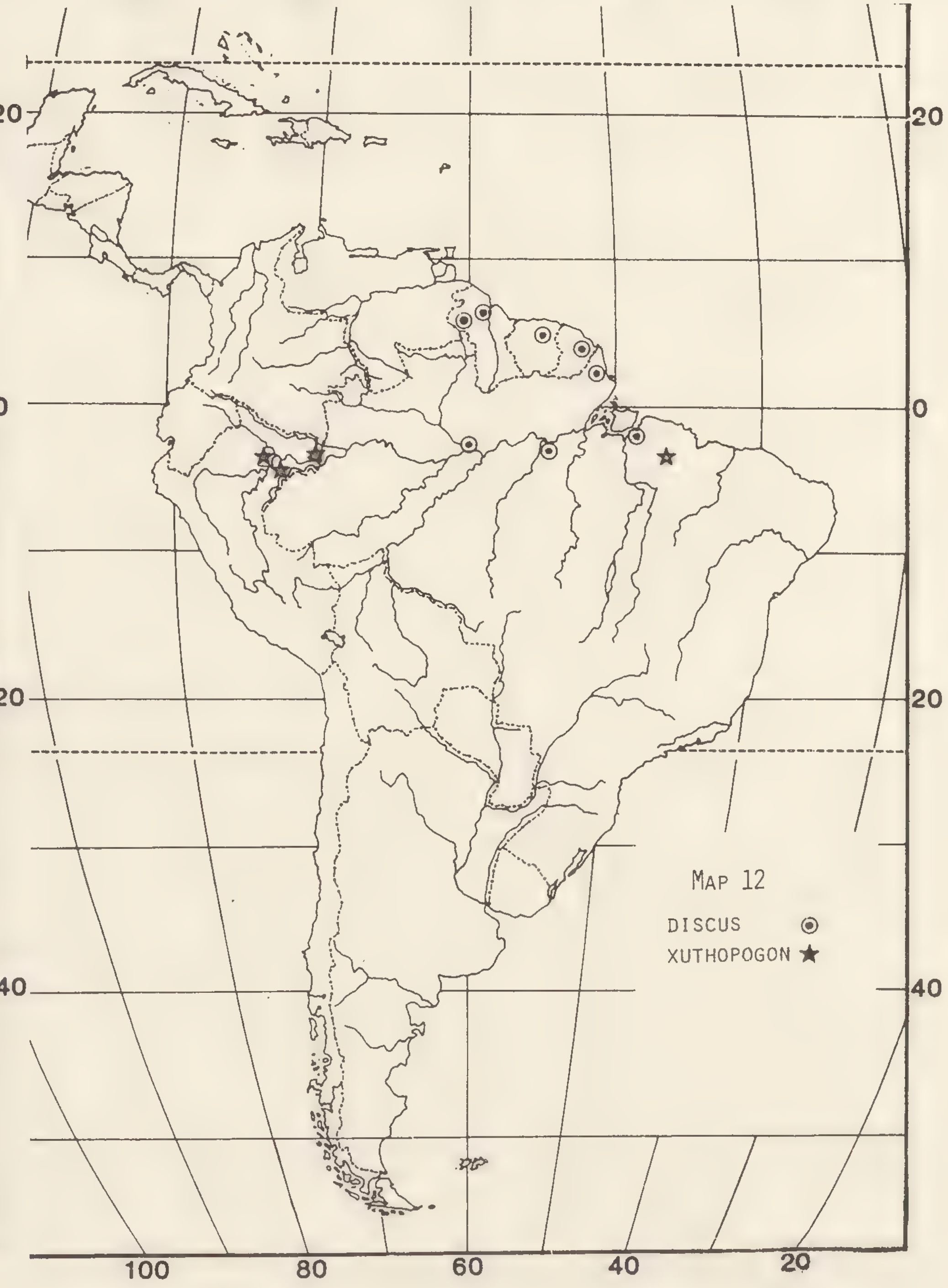
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